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REPORT OF THE

BUREAU OF COMMERCIAL FISHERIES

FOR THE CALENDAR YEAR

1962

United States Department of the Interior
Fish and Wildlife Service
Bureau of Commercial Fisheries

REPORT OF THE BUREAU OF COMMERCIAL FISHERIES

FOR THE CALENDAR YEAR 1962

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UNITED STATES DEPARTMENT OF THE INTERIOR

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BUREAU OF COMMERCIAL FISHERIES

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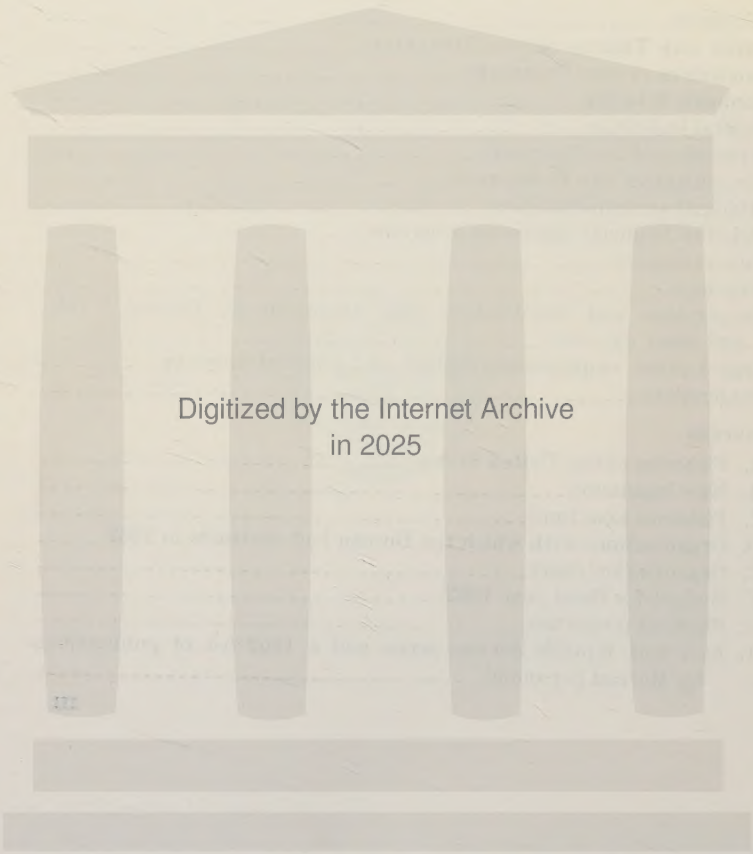

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Report of the Bureau of Commercial Fisheries for the Calendar Year 1962

This sixth annual report of the Bureau of Commercial Fisheries, one of the two Bureaus comprising the U.S. Department of the Interior's Fish and Wildlife Service, is made in compliance with section 9(a) of the Fish and Wildlife Act of 1956.

Commercial fishing is an important U.S. industry. In 1962 the commercial fishermen landed more than 5.2 billion pounds of fish and shellfish worth $385 million to them, the primary producers. Marine and fresh-water fish and shellfish provide food for our people and for livestock and poultry and a variety of products for industry and medicine. To keep production at this high level, and even to expand it, the Bureau conducts programs of research, development, and services for the commercial fishing industry and the people of the United States. Management of the Pribilof fur seal operations and associated research are important Bureau functions. Research programs are carried out at 18 biological laboratories, 7 technological laboratories and stations, 5 exploratory fishing bases and stations, and aboard a fleet of 23 research vessels. Research is also done under contract with biological institutions, universities, and State fish and game agencies. The Bureau's interest in oceanography has expanded greatly, and it has planned for 1963 in participation with a number of agencies of this country and abroad the International Cooperative Investigations of the Tropical Atlantic and the International Indian Ocean Expeditions. Marketing, Market News, Statistics, and Fishery Products Inspection offices are located at strategic points throughout the country.

The worldwide population explosion has resulted in a rapid expansion of the fisheries on all of the world's oceans as many nations seek protein from the seas for their people. Needs for basic biological information as a fabric for the formulation of sound management practices for the fish resources of the world and the needs for international cooperation for the resolution of fishing area conflicts have

made international cooperation necessary. As a consequence, Bureau personnel participate in numerous international meetings on both coasts of this continent as well as in Europe, Japan, and Latin America. Their underlying purposes are to protect the fishery resources, the rights and welfare of our fishing industry, and the supply of fish foods and products for our nation.

This annual report summarizes briefly the research indicated above. In addition, it discusses the many service programs of fishery products inspection, fishery market promotion, market news reporting, statistics collection, vessel loans and grants, and vessel safety promotion as well as the many cooperative activities of the Bureau.

Condition and Trends of the Fisheries

The commercial fisheries of the United States in 1962 landed 5.4 billion pounds of fish, shellfish, and other aquatic products, having an ex-vessel value of $396 million (Appendix A). This was an increase of about 3 percent in volume over the 1961 catch and a gain of about 9 percent in value. For the second consecutive year and the third time in history, the catch taken for manufacture into industrial products for use as bait and animal food exceeded the quantity taken for human food. Items taken in increased volume during 1962 included menhaden, Atlantic sea herring, yellowtail flounders, shrimp, and king crab. Smaller catches were made of ocean perch, pollock, tuna, Pacific sardines, Pacific herring, and whiting. U.S. fishermen received for the 1962 catch of fish, shellfish, and other aquatic products $34 million more than in 1961 and $23 million more than the previous record amount received in 1958.

San Pedro, Calif., with landings of 362 million pounds, valued at $36 million, was the principal U.S. fishing port with respect to both volume and value. Other leading ports in order of volume of fish caught were: Pascagoula, Miss.; Reedville, Va.; Empire, La.; Cameron, La.; and Lewes, Del. New Bedford, Mass., occupied second place in value of the catch, with landings which brought $16.5 million. Other leading ports in order of value of fish caught were: Boston, Mass.; Port Isabel-Brownsville, Tex.; San Diego, Calif.; and Gloucester, Mass.

The 1962 total U.S. supply of fishery products (catch plus imports) reached an alltime high of 10.3 billion pounds. Imports accounted for 49 percent of the supply—3.3 percent more than in 1961. The domestic catch and imports of edible fishery products were both considerably greater than in 1961, and the supply from these sources totaled a record 4.6 billion pounds. However, due to sharp increases in stocks of frozen and canned fish and shellfish and additional requirements resulting from the gain of nearly 3 million persons in the

Nation's population, per capita consumption of edible fishery products amounted to 10.5 pounds, .2 pounds less than in 1961. Imports of edible fishery products were a record 1.2 billion pounds (product weight). Individual items received in greater volume than in any other year were: groundfish fillets and blocks, 221 million pounds; shrimp, 141 million pounds; sea scallops, 11.6 million pounds; spiny lobsters, principally frozen, 35.9 million pounds; frozen tuna (including loins and discs), 283 million pounds; and canned oysters, 7.8 million pounds.

Some of the highlights of the fisheries in 1962 were:

1. The catch of menhaden, amounting to 2.3 billion pounds, was seven times that of salmon and also of tuna, which two species held second and third places, respectively, in the volume of fish caught. Menhaden accounted for 44 percent of the total poundage of fish and shellfish taken by U.S. fishermen during the year.

2. United States and Canadian fishermen took a record 75.1 million pounds (landed weight) of halibut in 1962—well over the previous record 72 million pounds taken in 1960. The value of the catch ($22.2 million) was far more than had ever been paid for halibut in any previous year.

3. Alaskan fishermen took a record 53 million pounds of king crabs in 1962—9 million pounds more than the previous high catch in 1961.

4. The catch of shrimp totaled 191 million pounds, having an ex-vessel value of about $73 million. This was a 9 percent increase in volume and 42 percent increase in value over the 1961 catch.

5. The 1962 fishery for Maine herring (used principally for canning sardines) was a remarkable improvement over the disastrous season of the previous year. In contrast to 1961, herring schools were readily available to fishermen, and the catch climbed to 158 million pounds, compared with only 54 million pounds the previous year.

6. Sardines again failed to appear in volume off Southern California, and only 15.4 million pounds were taken in 1962. Of this amount, less than 3 million pounds were caught from August through December. In 1961 over 40 million pounds were taken during this period.

7. The domestic pack of canned tuna in the United States, Puerto Rico, and American Samoa totaled a record 17 million cases, over one million cases above the previous record high packed in 1961.

8. The 1962 production of both fish sticks (72.2 million pounds) and fish portions (78.7 million pounds) established new records. Production of sticks was 2.4 million pounds more than in 1961 and portions, 18.8 million pounds more.

9. The production of fish meal in 1962 was close to the record

311,000 tons produced the previous year, despite continuous storms in North Carolina which prevented fishing during December, a normally productive month.

10. Imports of fish meal, received largely from Peru, totaled 252,307 tons—an increase of 34,462 tons, or 16 percent, over the previous record high received in 1961.

11. Average prices for fish and shellfish advanced substantially during 1962. The price index for all fish and shellfish rose from 115.7 in December 1961 to 120.9 in December 1962. The index for fresh and frozen fishery products gained 14.3 points; processed fresh, 12.9 points; and processed frozen, 11.4 points. Offsetting these substantial gains was a sharp, 11-point decline in the index for canned products.

Developments in the Fisheries

Domestic Fisheries

Developments in the fisheries often have an effect upon the industry, some more immediately than others and some for a longer time than others. These effects may be the result of technological developments, competition from similar products, changes in the available resources, or improvements in catching, handling, and processing or from other causes. Some significant developments that occurred during the past year and will affect the fishing industry in the future if not right away are mentioned here.

Underutilized Fish

To understand better the research and methods used in processing fish protein concentrate (FPC), Bureau personnel made an extensive study of FPC operations throughout the world. As a result of this survey, which was completed in 1962, the Administration requested the Congress to finance a research program designed to make FPC processing techniques available to the U.S. fishing industry. FPC would be an ideal diet supplement for the millions of protein-starved people in the world. Besides being relatively inexpensive, it can be made tasteless and odorless and has an indefinite storage life under all climatic conditions if properly packaged. In U.S. fishing waters there are approximately 7 to 9 million tons of fish not now harvested that can be utilized to produce FPC. In many regions processing FPC will allow our fishing fleet to become a year-round fleet rather than a seasonal fleet.

Industrial Fish for Oil

Competition from vegetable oils has drastically reduced the domestic markets for fish oils. The chief users for U.S. fish oils are for-

eign oleomargarine producers. The recent oversupply of domestic fish oil has been caused not only by the lack of domestic markets but also by the increased production of fish meal and oil seed meals and the resultant increase in oil production.

The fish oil programs are aimed to utilize the unique chemical features of these oils. Research has shown that most vegetable oils are unsaturated at the end of the molecule while fish oils are unsaturated in the midpoint of the molecule. If specific uses can be found for this chemical feature of fish oils, then other unsaturated oils could not replace them.

New Fisheries

Several new fisheries have started off the east coast of Florida and in the Gulf of Mexico and the Gulf of Alaska. Vigorous exploratory fishing and gear research activities by the Bureau substantially contributed to their development.

The excellent quantities of royal red shrimp taken during test drags on grounds previously discovered by the Bureau off the east coast of Florida and in the Gulf of Mexico stimulated commercial fishermen to commence harvesting these untrapped fishery resources. Within the year a fleet of 19 commercial trawlers was converted for deepwater fishing for royal red shrimp. Fishing operations for this new fishery probably will be between January and June—the off season for the inshore shrimp fisheries. For the rest of the year the fleet will return to its former operations of inshore fishing. Marketing difficulties have been encountered by the industry with this newly harvested shrimp, because its qualities are different than those of the commonly marketed white, brown, and pink varieties. Through combined Bureau–industry efforts, however, several outlets with favorable volume potential were established by May 1962. Future prospects for this new royal red shrimp fishery are good.

The extensive calico scallop resource discovered in 1960 off the east coast of Florida still awaits commercial utilization. The shucking operation aboard vessels at sea, arranged for last year, has presented a problem. It is now planned to open the scallops ashore. Markets are being located, and a Bureau-State-industry promotional program is ready on short notice when commercial production of this potential year–round fishery is begun.

An active commercial fishery for tanner crab has developed in Southeastern Alaska as a result of Bureau explorations in the Gulf of Alaska and its assistance in finding a process for the production of tanner crab meat. The product is being marketed both in Alaska and on the U.S. Pacific Coast.

New England Groundfish

The New England groundfish industry continued to decline. Reasons for the decline are increased competition from foreign countries, particularly Russia, on the North Atlantic fishing grounds, also fished by U.S. fishermen, and the increased competition for markets, both domestic and foreign, for its groundfish products. In 1962 the catch of groundfish by New England fishermen was less than in 1961, and the imports of groundfish into the United States were the highest on record. If the industry is to be saved from further decline, immediate as well as permanent relief over a long range of time from these international problems is necessary. One of the causes attributing to the financial problems of the fishermen themselves is the antiquated vessels and equipment. By the authority of the Act of June 12, 1960, a Fishing Vessel Construction Differential Subsidy Program was implemented in New England. Five vessels to be used in the New England groundfish fishery are currently being constructed under the program. Two are large steel trawlers, a much needed type that has not been built in this fishery during the past decade. Another measure of relief for the industry has been through the Area Redevelopment Program—the approval of over a million dollars in fish-processing plant loans, public facility loans, and grants for fishery products and technical assistance studies.

Federal Legislation

During calendar year 1962 the Congress passed nine bills pertaining to fishery matters. The purpose of three of the acts is to promote research on fishery resources, and that of three others is to conserve fishery resources through regulation of fishing. Three more acts are to provide financial aid to the fishing industry. These acts are briefly described here.

National Fisheries Center and Aquarium

One bill passed on October 9, 1962, authorizes the construction of and provides for the operation of a National Fisheries Center and Aquarium in the District of Columbia, or its vicinity, for research in fisheries and for display of fresh-water and marine fishes and other aquatic resources. It designates the Secretary of the Interior to operate such, who in turn is authorized to assign the responsibility to that Branch of Sport Fisheries and Wildlife primarily engaged in the rearing and holding of living fishes, including the operation of aquariums.

The act provides for the establishment of a nonpartisan Advisory Board composed of nine members, one of which shall be engaged in or associated with commercial fishing and shall be appointed by the

Secretary. The Chairman of the Board and the Executive Secretary of the Board shall be designated by the Secretary of the Interior. The functions of the Board are to render advice and to submit recommendations to the Secretary of the Interior concerning the management and operation of the National Fisheries Center and Aquarium.

The act provides for an appropriation of not more than $10 million for construction of the National Fisheries Center and Aquarium and for the establishing of charges for visitors and uses of it at rates that will liquidate the construction cost within 30 years or less and that will pay for its operation and maintenance.

Amendment to Tuna Conventions Act

Of importance because of its conservation measures for the tuna resources is the Act of October 15, 1962. It amends the Tuna Conventions Act of 1950, which provided for the appointment of United States Commissioners by the President and Advisory Committees by the Commissioners for the International Commission for the Scientific Investigation of Tuna and the Inter-American Tropical Tuna Commission. The Tuna Conventions Act of 1950 authorized the Secretary of State and the Secretary of the Interior, as head of the enforcement agency, to approve or disapprove the annual programs of the Commissions and the regulations of the Commissions requiring the submission of records of operations by persons participating in the fishery covered by the conventions. It authorized cooperation of Federal agencies with the Commissions in the conduct of scientific programs. The International Commission for the Scientific Investigation of Tuna is not active.

This Act of October 15, 1962, concerns the Inter-American Tropical Tuna Commission. It authorizes the Secretary of the Interior to issue regulations to carry out Commission recommendations designed to keep the populations of tuna at levels of abundance that will permit the maximum sustained catch. The Secretaries of State and Interior must approve such recommendations. The Secretary of the Interior may also issue regulations, with the concurrence of the Secretary of State, prohibiting the entry into the United States of fish from any country whose vessels are being used in a manner that tends to diminish the effectiveness of the Commission's conservation recommendations.

Pacific Marine Fisheries Compact Amendment

One Act of October 9, 1962, amends the Pacific Marine Fisheries Compact between the States of California, Oregon, and Washington by adding a new article XII and permitting the participation in the compact, as set forth by the terms of article XII, of Alaska and Hawaii and any other State having rivers or streams tributary to the Pacific

Ocean. Article XII states that upon admission of any new State, the purposes of the compact and the duties of the Commission shall extend to the development of joint programs for the conservation and protection of the fisheries of such State and to all waters of the State necessary to develop such programs.

Potomac River Compact Consent

By the Act of October 10, 1962, the Congress gives consent to the Potomac River Compact of 1958 between the State of Maryland and the Commonwealth of Virginia for conserving and improving the fishery resources of the tidewater portion of the Potomac River. To carry out this purpose the compact provides for the creation of the Potomac River Fisheries Commission consisting of six members, three from the Tidewater Fisheries Commission of Maryland and three from the Virginia Fisheries Commission. If there are more than three members on either State commission, the compact provides that the Governor of the State appoint the three members for the Potomac River Fisheries Commission from among the members of the State commission, and if less than three, the Governor appoint someone outside the State commission for the third commissioner. The term of office for a commissioner is the same as his term of office on the State commission, and if he is not on the State commission, it is 4 years. The compact provides that the Chairman of the Potomac River Fisheries Commission shall alternate from year to year between the representatives of Maryland and Virginia and shall be elected by the commissioners for 1 year. The compact provides that the commissioners receive $25 a day plus personal expenses while on duty; there be a commission meeting at least once each quarter and at such other times as the commission may determine; for a quorum for transaction of business, at least two of three members from each State must be present and vote; the commission shall establish and maintain an office at a location of its choice and may employ an Executive Secretary as well as other administrative, clerical, scientific, and legal personnel deemed necessary.

In order to conserve and improve the fishery resources, the compact provides that the commission carry on a research program, issue fishing licenses, adopt necessary regulations and enforce them, and approve and adopt a proposed annual budget to be sent to the two Governors.

Oyster Brood Stock Program

One Act of August 9, 1962, authorizes the Secretary of the Interior, with respect to States where he finds that excessive oyster mortality presents an immediate and substantial threat to industry economic stability, to acquire oyster brood stock resistant to the disease causing the mortality and to transfer such brood stock to the States concerned.

The States in turn shall distribute the resultant seed oysters in accordance with cooperatively developed plans. The act provides that the participating States pay one-third of the cost of the program. The act also authorizes a sum not to exceed $100,000 for the making of grants to such States to assist in the financing of research and other activities necessary in the development of disease-resistant strains of oysters, provided the participating States agree to use an additional amount for the same purposes equal to at least 50 percent of the grant.

Transfer of Vessel *Alaska*

Another Act of August 9, 1962, provides for the transfer of all right, title, and interest in the U.S. vessel *Alaska* by the Secretary of the Interior to the State of California for the use and benefit of its department of fish and game. Since 1957 the *Alaska* has been operated by that department under a 10-year agreement between the Secretary of the Interior and the State of California. It has been repaired and refitted for biological research by the State of California. The act provides for conveyance of the vessel upon payment by the State of California to the Secretary of the Interior of 50 percent of the fair market value when leased by the State and that the vessel shall be used for a public purpose, and if such use should cease, the vessel will revert to the United States.

Financial Aid to Fishing Industry

Of the three acts that authorize financial aid to the fishing industry, one provides for production disaster loans to oyster planters. A second act, section 343 of the Food and Agriculture Act of 1962, authorizes operating emergency loans for fish farmers under Federal Agricultural Credit Regulations. The third, the Act of September 25, 1962, extends to fishermen the same treatment accorded farmers in relation to estimated income tax. It makes it possible for commercial fishermen to file their tax estimate at the end of the tax year and pay the amount by the following January 15, rather than file the estimate by April 15 of the same tax year and pay the estimate quarterly during the year. Alternatively, commercial fishermen have the option of filing the return and paying the tax on or before February 15 following the close of the tax year.

A list of the legislation is given in Appendix B.

International Developments

Developments in the world's fisheries have created problems of competition for and conservation of the fishery resources and have also increased competition for the markets of the world. The Bureau recognizes that many problems exist for the U.S. fishing industry because of increased foreign fishery activity and assists it in solving

these problems. The Bureau provides and analyzes information on the most recent developments in the fisheries in order to determine what actions should be taken to make our fishing industry competitive on the high seas and in international commerce. The Bureau also participates in international fishery meetings to guide rational exploitation of marine species and to protect the rights of U.S. fishermen and in the enforcement of treaties resulting from the meetings. The Bureau participates in trade and tariff negotiations to assist in developing positions and policies designed to encourage the movement of U.S.-produced fishery products in domestic and foreign markets.

Developments in Foreign Fisheries

From 1950 to 1961 fishery landings throughout the world doubled to reach a total of 41,200,000 metric tons. They are continuing to increase, and many experts believe that a further doubling of the world catch is possible in the next decade or two. This substantial increase in world fisheries has involved both the fisheries harvesting fish for direct human consumption and the fishery industries that manufacture such fishery products as fish meal, fish oil, and fish solubles. In the last decade, the fishery harvest of the United States has increased at a much slower pace than the world's fishery catch. In 1950 the U.S. catch was 2.6 million metric tons compared to 2.9 million metric tons in 1961. Preliminary estimates indicate that the U.S. 1962 catch totaled about 2.6 million metric tons. From its former position as the second fishing nation in the world, behind only Japan, the United States has slipped to fifth place behind Japan, Peru, Mainland China, and the U.S.S.R.

Japan and Russia have been expanding their fisheries in the eastern North Pacific. Japan resumed extensive fishing in the North Pacific Ocean and the eastern Bering Sea in the 1950's. The Soviet Union sent her first large-scale fleet into those waters in 1959 and began operations in the Gulf of Alaska in 1962. Soviet exploratory fishing vessels were sighted off the coasts of Oregon and Washington as well as off the coasts of the Carolinas and Florida and in the Gulf of Mexico in the past year. Recently the Soviet Union announced that it will construct vessels specifically designed for tuna fishing.

In the Northwest Atlantic in the past year, Polish and Norwegian fishermen, as well as Russian, were active off the New England coast. Heretofore, only the Russians had been seen on these grounds. The Russians began fishing in the Northwest Atlantic Ocean off the coast of New England in the spring of 1961 and by midsummer of that year were operating approximately 100 fishing vessels of various types. They returned to Georges Bank in 1962, and before the year's end, a Soviet fishing fleet of 219 vessels had been counted. The fishing effort

has been directed primarily toward herring, which have been taken by otter trawls and drift gill nets.

In the autumn of 1962 the Japanese undertook an exploratory fishing operation in waters covered by the International Convention for the Northwest Atlantic Fisheries—Iceland to Greenland, down to Canada, and on to Cape Cod. Catches made by this vessel have been landed at St. Pierre (French) and have been transferred to cargo vessels for export to the United States. Plans are now underway for other Japanese vessels to take groundfish in the Northwest Atlantic.

Foreign Fishery Information Program

In 1962 the Bureau followed closely the activities of foreign craft off U.S. coasts. Locations and activities of Soviet fishing fleets and exploratory fishing vessels were reported regularly. In addition, current reports covering Soviet, Japanese, and African fishery developments were released. Because there has been a large demand for information on Soviet activities and on developments in the African fisheries, releases were issued entitled "Briefs on U.S.S.R. Fisheries" and "Briefs on African Fisheries."

Foreign Reporting Program

The Bureau, in collaboration with the State Department, has intensified its foreign reporting program. Fishery reports were received regularly from some 90 U.S. embassies and consulates and from the three full-time fishery attachés assigned to Copenhagen, Tokyo, and Mexico City. The European Regional Fishery Attaché (1) provided information on tariff and trade policies affecting fisheries of the Common Market, (2) participated on the Fisheries Committee of the Organization for Economic Cooperation and Development (OECD), (3) presented for consideration the U.S. viewpoints regarding proposed fishery development programs of OECD, and (4) assembled and submitted detailed data on the cost of construction and operation of European-built factoryship stern trawlers. The Regional Fishery Attaché for Latin America surveyed (1) the shrimp fisheries of Guatemala, El Salvadore, and Nicaragua and (2) the fishery potential of southern Brazil. Detailed and current reports on the fisheries of Mexico and Peru for 1961 were also submitted. The Fishery Attaché at Tokyo was instrumental in obtaining permission for U.S. observers to board Japanese fishing vessels to witness firsthand the nature of the extensive fishing operations of the Japanese in the North Pacific and Bering Sea.

Treaty Enforcement and Foreign Fishing Surveillance

Beginning in 1959 and continuing at an ever-increasing rate of emphasis, the Bureau has been called upon to intensify its program of fishing treaty enforcement and foreign fishing surveillance in inter-

national waters, particularly those off the coast of Alaska where the Japanese and the Russians have concentrated their greatest fishing efforts. Under the terms of the International Convention for the High Seas Fisheries of the North Pacific Ocean, the Bureau, in cooperation with the U.S. Coast Guard, has conducted extensive aerial and sea patrols to assure that the Japanese comply with their agreement to abstain from fishing for (1) salmon east of the provisional line at longitude 175° W. and (2) halibut originating along the coast of North America. On the large numbers of Japanese catcher and factory vessels that have been boarded, there has been no indication of violations of the treaty. There is no basis in law for boarding Russian fishing vessels on the high seas, so information on their activities is gained by observing their fleet and by trawling in the vicinity of their vessels to determine the species composition of their catch.

In the western Atlantic the Bureau has started investigations to ascertain the effects on the fish stocks of the great increase in fishing effort by the Russians, Japanese, Polish, and Norwegians. Historically the western Atlantic is a very productive area, and it is essential to the welfare of our American fishing industry that some means be found to conserve the fishery resources there.

Because of the possible serious adverse effect of the entry particularly of Japan and Russia upon fishing grounds traditionally fished by U.S. fishermen, concerted efforts are being made to keep the operations of their fleets under observation. Depending upon weather conditions and equipment availability, observations are made through sea and air patrols carried out in cooperation with the U.S. Coast Guard and the U.S. Navy.

International Meetings

Fishery issues were resolved at meetings of various international fishery bodies, such as the International Pacific Salmon Fisheries Commission, the International Commission for the Northwest Atlantic Fisheries, the Great Lakes Fishery Commission, the Inter-American Tropical Tuna Commission, the International Pacific Halibut Commission, the International North Pacific Fisheries Commission, the North Pacific Fur Seal Commission, and the International Whaling Commission. Bureau officials participated in these meetings. Details on the more important meetings are given later, in the Meetings section.

Trade and Tariff Negotiations

Bureau officials took part in the Geneva trade agreement negotiations under the General Agreement on Tariffs and Trade (GATT). During the negotiations, the United States obtained several important tariff concessions from the Common Market. One of these was a binding guarantee that menhaden oil would remain free of duty. In

addition, duty rates on frozen salmon were reduced from 16 percent to 10 percent, canned salmon from 20 percent to 16 percent, and canned pilchards from 25 percent to 20 percent.

Accomplishments and Operations

Principal Accomplishments

The Bureau of Commercial Fisheries engages in an almost endless roster of activities, which it organizes by major geographic areas of the United States so as to bring to bear upon the difficulties and problems of fish producers, distributors, and consumers the combined knowledge and skill of the Bureau's experts. The principal accomplishments for the calendar year 1962 are briefly recounted.

North Pacific

Whale resource management and harvest.—Whale catching and land processing operations of five companies located in California and Oregon were licensed and inspected. A total of 248 whales were captured and processed, the principal market for the whale meat being fur animal ranchers.

For the first time since the inception of the International Convention for the Regulation of Whaling, concluded at Washington in 1946, the Master of a whale catcher was apprehended, prosecuted, and convicted on three counts for the unlawful capture of three undersized whales.

The United States, as a member of the International Whaling Commission, agrees to "encourage, recommend and if necessary organize studies and investigations relating to whales and whaling." The Commission Scientific Committee appointed a working group to begin a study of the condition of the North Pacific whale stocks. This working group comprises scientists from Canada, Japan, the United States, and the U.S.S.R. A special joint meeting of the Scientific Committee and of the Committee of Three Scientists took place in Seattle, Wash., in December 1962. A report on the special scientific investigation of Antarctic whale stocks was completed at this meeting and sent to the Commissioner of each party nation.

To begin a determination of the condition of the North Pacific whale stocks and of the whale stocks utilized by the two U.S. whaling companies, the Bureau made a whale marking and observation cruise aboard a chartered whale catcher in waters off southern California and northern Baja California. This was the first whale marking done by the United States. Sixteen whales were successfully marked, and concentrations of fin whales were located.

Fur seal resource management.—The Bureau continued its functions

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of administering the fur seal industry of the Pribilof Islands and providing care for the Aleut residents.

In October the Department of the Army agreed to lend to the Bureau a small freighter from its mothball fleet to be used as a replacement for the Bureau's *Penguin II*. Because of its age and small size and other circumstances, the *Penguin II* had become inadequate for transporting passengers and supplies to the Pribilof Islands. A vast improvement in the Pribilof supply operation will be possible in 1963 when the substitute vessel has been reactivated and placed in service.

A new pay plan for the Aleut workers on the Pribilofs was placed in effect on July 1, 1962. The plan extends to all Federal personnel on the Islands Civil Service status, including standardized job classification and rates of pay comparable to those prevailing elsewhere in Alaska.

Secretarial services were again supplied to the North Pacific Fur Seal Commission, which held its Fifth Annual Meeting in Ottawa, Canada, from February 7 to 9, 1962, and its Sixth Annual Meeting in Washington, D.C., from November 26 to December 3, 1962.

Fur Seal Commission report.—The Bureau contributed to the "North Pacific Fur Seal Commission Report on Investigations from 1958 to 1961." This report was submitted by the Standing Scientific Committee to the Commission and was approved by that group in November 1962. Conclusions of the report were substantiated by the research carried on during 1962. Outstanding points were: Data so far collected do not provide the basis necessary for a reliable quantitative assessment of the effect of fur seals on other living resources; studies indicate that the Pribilof herd has attained a population level in excess of the desired number calculated to sustain a maximum annual harvest; analysis of the data shows that the Pribilof herd is capable of sustaining an estimated continuing harvest of 65,000 males and 35,000 females from an annual recruitment of about 480,000 pups.

Fur seal harvest.—The year produced a take of 77,915 sealskins of commercial value. On St. Paul Island, 42,983 male seals were taken from July 2 through August 24, while 17,595 females were taken in continuation of the program inaugurated in 1956 to reduce the herds through the harvest of female seals as well as males. The take of seals on St. George Island during the same period produced 10,477 male sealskins and 6,860 female skins, making a total harvest on both Islands of 53,460 males and 24,455 females. Under the terms of the Interim Convention on Conservation of North Pacific Fur Seals, 15 percent of the sealskins taken, plus 375 additional skins, respectively, were delivered to the Governments of Canada and Japan.

The spring auction sale of sealskins was conducted by the Fouke Fur Company in April at St. Louis, Mo., and the fall auction in October at Greenville, S.C., the site to which the company had moved its headquarters and processing facilities. A grand total of 48,513 sealskins were sold for the account of the United States. Gross sales of these skins totaled $4,446,798 and netted the U.S. Treasury the sum of $2,908,939.

In January 1962 the Fouke Fur Company, which had been processing sealskins for the U.S. Government for approximately 40 years, was notified that its contract with the United States would be terminated effective December 31, 1962. During the year, considerable time and effort were devoted to arrangements for the negotiation of a new contract for the processing and sale of sealskins.

Exploratory fishing.—Shellfish explorations in the Gulf of Alaska, using the chartered exploratory fishing vessel M/V *Yaquina*, resulted in the location of at least two commercially valuable stocks of king crab off Kodiak Island. These stocks are in areas about half the distance from port as previously established commercial grounds. Marketable crabs in commercial quantities of more than 30 crabs per pot were found at depths of 46 to 82 fathoms in a submarine gully extending about 40 miles southeast of Cape Chiniak. The average catch per pot of 48 pots set in this area was 24 marketable male crabs, averaging about 10 pounds each. The second area, of potential value to the commercial fishery during the summer period, was located in a broad submarine gully about 20 miles due east of Marmot Island. In this area, 46 pots caught an average of 20 marketable crabs each within a depth range of 59 to 94 fathoms. The best catch from a single pot was 64 crabs. From bottomfish exploration by the Bureau's M/V *John N. Cobb* between Cape St. Elias and Portlock Bank, information was developed which was used by U.S. officials at international meetings dealing with the conservation and utilization of the groundfish resources of the area.

Midwater trawl gear tests.—The *John N. Cobb* was used to field test a modified giant midwater trawl that can be towed by a single vessel. The tested nylon net of 1.5 million meshes is over 300 feet long and has an opening of 7,000 square feet. Tests were made of the pelagic trawl's utility as a biological sampling tool and efficiency for possible commercial application. During these tests, both surface tows and middepth tows were made off California, Oregon, and Washington. The utility of the pelagic trawl for gross biological sampling was demonstrated by the wide variety of specimens taken during the tests. Commercial use of the gear for the capture of midwater schools of fish shows promise, but additional experiments on known fish concentrations will be required before a determination of commercial feasibility can be made.

Emergency salmon research programs.—Two salmon programs were carried on as emergency efforts, because the need for certain information was acute.

A 2-year emergency salmon research program in Alaska ended in 1962. It was designed to help fill the void between theory and fact about salmon. Complete information concerning salmon is needed for successful renegotiation of the International North Pacific Fisheries Convention in 1963. From this program, a better understanding of the Pacific salmon runs and their management has resulted. This program was a significant cooperative effort between Federal and State governments and the academic community. The Fisheries Research Institute of the University of Washington and the Alaska Department of Fish and Game, working under contract arrangements with the Bureau of Commercial Fisheries, have determined the carrying capacity of the fresh-water spawning and nursery areas.

The Fish Passage Research Program, initiated at the request of the Secretary of the Interior, completed its first year during 1962. The purpose is to provide factual information on the requirements of migrating fish, particularly for those that encounter high dams and impounded waters.

One phase of this research program culminated in 1962 with the successful evaluation of a new fishway design. Fishway construction had changed very little until prototype tests indicated actual construction of a new design would be feasible. This new design was incorporated into one of the Ice Harbor Dam fishways; the other fishway was constructed in the standard design. Evaluation tests indicated that performance of salmonids in the new 1-on-10 slope fishway was about the same as salmonid performance in the conventional 1-on-16 slope fishway. Adult salmonids successfully ascended the 1-on-10 slope ladder, and comparisons of passage times between the two ladders indicated that performance patterns did not differ markedly.

A contract to explore methods of controlling infectious diseases of salmon during passage at dams or in periods of confinement was awarded to the Oregon Fish Commission. Chemical treatment of salmon in the holding ponds at Oxbow Dam in 1962 can be given credit for part of the 38 percent decrease in mortality over 1961.

High seas salmon research.—The first winter high seas salmon survey cruise was made in 1962 in the North Pacific Ocean, and a significant concentration of immature red salmon was found in a broad area approximately 200 miles south of Kodiak Island. Important information was collected which will assist us in understanding the basic system underlying the distribution and survival of salmon at sea.

The United States has been required by the International North Pacific Fisheries Commission to provide information which would

best establish a line separating North American and Asian salmon at sea. Methods were developed in 1962 for distinguishing between North American and Asian pink salmon. Similar methods for chum salmon are in advanced stages of development. These methods follow the previously established system of origin separation for red salmon.

Salmon literature codified.—A system of information storage and retrieval for all salmon literature was completed, and a 108–volume set of coded salmon literature has been produced. These volumes, which represent 40,000 pages of original text published from 1900 to 1959, are being made available to libraries.

The Columbia River Fishery Development Program.—This program of fishery development and management began its 14th year. Maintenance of hatcheries continued throughout the Columbia River Basin. Early in the year a good run of steelheads returned to Eagle Creek National Fish Hatchery. A surplus of 1,152 steelheads was transferred to other streams with available spawning area. Later in the year the program hatcheries took 13.5 million spring chinook salmon eggs, 75.4 million fall chinook salmon eggs, and 51.9 million silver salmon eggs. The take of chinook eggs was about average, but the take of silver salmon eggs is the largest on record, showing that hatchery propagation of this species has been highly successful. A marking program was continued to determine contributions of hatchery fish to commercial and sport fisheries. Under this program 6 million fall chinooks and 1 million sockeye salmon were marked.

Construction and operation of fish screens and fishways also continued throughout the basin. Five hundred and nine fish screens are now operated under this program. Assistance in planning fish facilities was given to several other governmental agencies and to private companies during the year. Good progress was made in negotiating for the improvement of fish-passage facilities at existing dams and in planning for fish facilities in new projects. One radical departure from past requirements on passage of downstream migrant fish was the approval of the Corps of Engineers plans to pass downstream migrants through the turbines at the Corps' Foster project in Oregon. A careful evaluation of this passage is planned. A program of frequent inspections improved the operations of fish facilities at several dams on the Columbia River.

Cooperation continued with the Bureau of Sport Fisheries and Wildlife, with other governmental agencies, and with private companies on the effects of water-development projects on fish. Projects of all sizes were investigated, and a total of 309 were reported upon.

The operational studies continued. They are aimed at eventual improvement in production of fish in the Pacific Northwest. During the year, an average of 28 projects were underway. The investiga-

tions were in the fields of salmon predator control, natural rearing, improvement of natural habitat, and fish cultural techniques. Over half the studies dealt with fish culture. Five State fish and game departments and two universities, as well as the Bureau's staff, are conducting the research. The studies are advancing, but thus far few have been completed.

California

Fish development studies.—An interesting advance was made by the Laboratory staff at La Jolla in their study of the early development of fishes. A temperature-gradient block was employed for the investigation of fish development at 18 different temperatures simultaneously. The overall effects of temperature on the development of one group of fish eggs were, therefore, determined in a single experiment.

Tuna behavior.—Studies are underway to determine the behavior and responses of tuna to purse seines and the effect of environmental conditions, such as the depth of the thermocline. Experiments on tuna behavior showed that skipjack can recognize and respond to underwater sound in experimental ponds. A specific olfactory response of tuna has been demonstrated to a solution of 1 part of "fish-scented" water in 50,000 parts of sea water.

Hawaii

Tuna populations.—Several findings from the research on tuna populations were reported for the year. Serology is proving to be a very useful tool in separating and defining fish populations. Through differences in their blood group systems, it has been determined that the large "season" skipjack that enter Hawaiian waters during the summer are of a different race than the small skipjack that are present the year round. Conclusive evidence has been found that a third subpopulation of skipjack entered the Hawaiian commercial fishery in 1962. Blood samples from albacore caught in the eastern North Pacific and from the Samoan longline fishery reveal that stocks in the Northern Hemisphere are genetically isolated from those occurring south of the Equator. This is important information to the scientists attempting to calculate the effects of fishing on the stocks.

Gulf of Mexico

Exploratory fishing.—Exploratory operations by the Bureau's research vessel *Oregon* in the western Caribbean Sea revealed good trawling grounds for yellow-eye snapper off the coast of Nicaragua. Catches with exploratory trawl gear produced from 95 to 120 pounds of 13- to 26-inch snapper with the best catches in depths of 80 to 85 fathoms. Recorded echosounder tracings of the area explored indicate that there are several hundred square miles of smooth bottom

at the depths where the best snapper catches were obtained. In addition, numerous small schools of blackfin tuna were observed off Honduras, Nicaragua, and Costa Rica. The schools were concentrated at the edges of the Continental Shelf. Two large schools of yellowfin were observed off Punta Patuca, Honduras.

Shrimp gear research program.—Work began on the shrimp behavior phase of the shrimp gear research program. Preliminary studies were directed toward learning more about (1) the burrowing habits of commercial shrimp as related to fishing gear and (2) the reaction of commercial species of shrimp to low-level electrical fields. Initial objectives were to determine the extent and duration of bottom penetration by the various species. Data were collected on the manner in which shrimp burrow on various bottom types, depth of burrow as related to size, and total time burrowed during a 24-hour period. Considering the effects of behavior on the efficiency of commercial fishing gear, this study will prove a valuable adjunct to the investigations dealing with the mechanics of shrimp gear.

Underwater observations of shrimp trawls in action resulted in completion of a 30-minute, 16-mm. film "Gulf of Mexico shrimp trawls," which is being circulated on a request basis.

Atlantic Coast

Royal red shrimp explorations and fishing.—In January excellent catches of royal red shrimp were taken in deep water (175–210 fathoms) off Daytona Beach, Fla., during exploratory operations by the Bureau's charter vessel *Silver Bay*. With technical assistance rendered by Bureau gear experts, the commercial trawling fleet fishing royal red shrimp expanded to 19 vessels. Some 69,000 pounds of royal red shrimp were landed at St. Marys, Ga., by 13 vessels between February and June, at which time the fleet returned to inshore fishing. Additional catches were also landed at the Florida ports of Mayport, St. Augustine, and Port Canaveral. The deepwater royal red shrimp grounds were first discovered during Bureau explorations in 1956, but until 1962 commercial attempts to utilize these stocks were limited to sporadic efforts.

Trawling for bottomfish.—Bottomfish explorations by the *Silver Bay* from Cape Lookout, N.C., to Cape Canaveral, Fla., resulted in the location of several favorable trawling bottoms inhabited by commercial quantities of readily marketable fish species. These will provide additional productive areas for the commercial trawl fishery started in the autumn of 1961 on grounds of bottomfish off mid-South Carolina discovered by the *Silver Bay*. From an initial fleet of three vessels, the operation increased until eight vessels were in this fishery during 1962.

Dedication of new laboratory at Woods Hole.—The Bureau of

Commercial Fisheries' new Biological Laboratory at Woods Hole, Mass., was dedicated on June 23, 1962. The building program began in 1957 and was completed in 1961. All buildings and docks were replaced by new, modern structures at a cost of more than a million dollars.

The original Fisheries Laboratory at Woods Hole was the first fishery-marine biological research laboratory in the United States. It was established in 1871 at the Lighthouse Station and in 1883 was moved to its present location, on land given to the U.S. Commission of Fish and Fisheries, a predecessor agency of the U.S. Fish and Wildlife Service, for the purpose of establishing the Laboratory on a permanent basis. The ravages of time and three hurricanes eventually necessitated a program of replacing the facilities.

The new three-story laboratory building has 24,000 square feet of floor space devoted to "wet laboratories" (equipped with running sea water), as well as other laboratories, offices, a scientific library, and a conference room. A second building houses maintenance facilities and an aquarium for experiments on marine fishes. The aquarium functions during the summer as a public exhibition. It was visited last year by more than 200,000 persons. The new dock facilities are designed to accommodate oceangoing vessels, as well as smaller vessels for use in inshore work. The new fishery-oceanographic research vessel *Albatross IV* docks there.

The laboratory has a staff of 25 scientists, supported by 55 technical and administrative personnel, conducting biological and oceanographic research programs concerned with the problems of conservation of the offshore groundfish of the Northwest Atlantic—haddock, cod, redfish, whiting, flounders, and industrial species—and sea scallops. Groundfish support one of the most valuable fisheries of the world, utilized and managed by 13 nations under agreements established by the International Commission for the Northwest Atlantic Fisheries (ICNAF). The research commitments of the United States under ICNAF agreements are responsibilities of the Woods Hole staff. The natural production of these species are computed in order to advise what measures must be taken to achieve a sustained maximum yield. Bureau scientists also collect information that is necessary for documenting the natural changes that occur in environment and in populations.

Herring research.—In 1962 herring research at the Bureau's Biological Laboratory in Boothbay Harbor, Maine, dealt with studies of inshore habitat and early life history stages, age and growth, migrations, blood group systems, disease, and statistics of catch. The general objective is an understanding of fluctuations in abundance and availability, particularly of immature herring used as sardines. The

need for information was emphasized by the extremely small catch during the 1961 season, apparently related to an unfavorable distribution of fish. A detailed study of the inshore habitat, started late in 1960, has provided information about distribution and abundance of early life history stages of herring in relation to environmental conditions. In inshore areas the earliest life history stages were relatively more abundant at stations subject to greater influence of fresh water. Bimonthly cruises are carried on to provide a measure of abundance that is independent of the fishery and to provide information about variations in the inshore environment.

Experimental taggings with a plastic loop tag with a V-shaped nylon plug concentrated on tests of the effectiveness of various colors. Yellow tags gave the highest recovery rate of the colors tested.

A blood group system has been used to distinguish two groups of immature herring along the New England coast. Results of this year's study have indicated a change in distribution from that of 1957 and 1958. Continuing studies of the system in spawning populations on Georges Bank and the coast of Nova Scotia indicate its stability in such populations and indicate that the boundaries of immature stocks have shifted in location.

Samples of herring were examined for fungus and protozoan infections. Fungus disease remained at a very low ebb in Gulf of Maine immature and adult herring. Protozoan infections were sought principally as natural tags for immature herring, as an expansion of earlier research using parasites, which indicated little movement of sardine-size fish during the fishing season.

Trawl gear research.—Outfitting of the Bureau's M/V *Rorqual* for trawling and trawl instrumentation research has greatly expanded the activities of the North Atlantic trawl gear improvement program. The development of a system of sonic transducers mounted on the headrope of the trawl was of particular importance in permitting the presentation of measurable data on the behavior of the trawl while fishing. Preliminary tests of this equipment established the superiority of an all-sonic system over the previously used linear-potentiometer system for making trawl measurements. All recordings of linear distances, such as between the trawl doors and between the ground and the height of headrope, were made upon an echo-sounder recorder located in the wheelhouse of the vessel. Clear tracings on the recorder could accurately be read to within 6 inches of the actual distance being measured. The gear-improvement program is designed to increase the knowledge of the behavior of trawls while fishing so that a sound basis for modification of trawl design and for consequent improved handling can be effected.

New trawl equipment increases safety on vessels.—Several marine

insurance underwriters have offered a 5-percent reduction in protection and indemnity insurance premiums for all New England fishing vessels that install trawl wire level winders on the main winches of the vessels. This action was a result of the efforts of the Bureau's commercial fishing vessel safety program. Without mechanical level-winder guides to keep the steel towing wire running onto the winch drum evenly, two men are required to work in close quarters to the winch to feed the cable manually onto the drums. On the vessels installed with the level winders, there will be eliminated one of the most hazardous situations for severe injury on commercial trawlers. Considerable savings will be realized by the vessel operators in the insurance costs for fishing vessels as an improvement in operational efficiency through reduction of accidents at sea.

Great Lakes

Lamprey–control and lake trout–rehabilitation programs.—Chemical control of the sea lamprey of Lake Superior is beginning to show good results. In 1962 the total catch of adult sea lampreys at 37 barriers on Lake Superior streams was 9,992 individuals. Compared with the catch of 71,156 lampreys in 1961, the reduction in abundance in 1962 was 86 percent.

Additional evidence exists of the effectiveness of chemical control. When catches of downstream migrating juvenile lampreys in Lake Superior streams were compared to catches in untreated streams of Lake Michigan, Bureau scientists found untreated streams to harbor 40 times more lampreys. Also, they reported fewer lamprey wounds on Lake Superior lake trout and the trout survival rate enhanced. Operation must continue on a reduced scale in Lake Superior to make sure that surviving adults will not reinfect the streams. This reduced effort will allow control activities to be intensified in Lakes Michigan and Huron.

Good progress was made in rehabilitating the lake trout population in Lake Superior. Slightly over 1.8 million fingerling trout were stocked in 1962. The growth and survival of the hatchery-reared fish from the 1959–61 plantings has been so good that the abundance of 14- to 20-inch fish has increased to pre-1959 levels. The growth of the fish more recently planted in Wisconsin waters of the lake has been large enough to almost equal the growth of those fish from natural reproduction. In Michigan waters, however, these young fish are not so abundant except in areas immediately adjacent to planting sites.

Lake Michigan underutilized fish studies.—In Lake Michigan intensive studies were carried out during the year on the early life history and depth distribution of chubs and associated species. Survey techniques were developed to determine if chub larvae or fry

were present, and a system devised to establish their distribution where present. The depth distribution of chubs and other species varied greatly with the seasons. Water temperature was found to influence distribution to the extent of affecting the success of commercial fishermen. When fish distribution data are related to other environmental conditions and to age, maturity, and sex of fish, it will be possible to provide prediction services to the fishing industry on the pattern of distribution and the availability of commercial fishes.

Exploratory fishing.—In connection with the Lake Michigan fish studies, a 3-month trawl survey was made of Lake Michigan by the Bureau's exploratory fishing vessel *Kaho*. This was the initial cruise for the *Kaho*, which was commissioned in fall 1961. The survey yielded valuable information concerning the condition of the fishing grounds and the seasonal distributions of stocks of chubs and alewife. Significant catches, consisting mostly of bloater chub, were made throughout the areas surveyed. Those of midsummer were more productive than those earlier in the spring. The catches ranged from about 400 pounds per hour to as much as 1,292 pounds per hour and were made in water depths of 9 to 40 fathoms. The recently started Great Lakes trawl fishery benefited from these exploratory operations—the efficiently fished unfamilar areas of Lake Michigan and the harvesting of the underutilized fish species.

Similar exploratory cruises in Lake Erie resulted in good catches of yellow perch, alewife, sheepshead, and carp in the western part of the lake and excellent catches of smelt in the eastern part, north of Erie, Pa.

Rice field fisheries.—The Bureau continued its market-development and technical assistance efforts to aid the Arkansas fish-farming industry in the commercial production and utilization of fish produced in flooded rice acreage in rotation with rice field crops. The lowland farms in Arkansas and adjacent States offer a tremendous potential for commercial fish production for human and animal food.

General

Oceanography program.—The Bureau of Commercial Fisheries has continued its efforts, in cooperation with other Government groups and agencies, universities, and private research institutions to meet an important objective of the National Oceanographic Program: The maximum development and use of the living resources of the sea. In 1962 the Bureau made significant progress in many of its oceanographic-fishery research programs. The formation of an Interior Oceanographic Planning Committee, consisting of representatives from the Bureaus of the Department, greatly improved the coordination and planning procedures within the Bureau and within the Department. The first task of this committee was to draw up a

long-range oceanographic program for the Department, which is now in draft form.

In 1962 the Bureau planned its participation in two important international oceanographic expeditions: The International Indian Ocean Expedition and the International Cooperative Investigations of the Tropical Atlantic (ICITA), which will be carried out in 1963. The Bureau initiated the latter program and is responsible for its coordination and general planning.

The construction of new laboratories and the improvement of others is part of the Bureau's oceanography program. Besides the new fishery biological laboratory at Woods Hole, Mass., dedicated in June 1962, plans have been drawn and funds are available for a new biological laboratory at Seattle, Wash. Also land was acquired, and the design and plans completed for a new biological laboratory to be built on the campus of the Scripps Institution of Oceanography at La Jolla, Calif. Actual construction will start soon at La Jolla. Additions or improvements have been made to laboratories at Boothbay Harbor, Maine; Beaufort, N.C.; Oxford, Md.; Galveston, Tex.; and Auke Bay, Alaska. Progress was made on the plans for those facilities that were funded in 1961.

Construction of vessels for oceanographic research or acquisition of vessels by other means for such purpose is also a part of the Bureau's oceanographic program. The new 187-foot ship, the *Albatross IV*, a combination stern ramp trawler and oceanographic research vessel, was delivered in November to the fishery laboratory at Woods Hole. This ship will be used in studies of the western North Atlantic groundfish and scallop resources and of the effects of domestic and foreign fishing on these marine stocks. A contract has recently been awarded for the construction of a 158-foot oceanographic-fishery research vessel, the *Townsend Cromwell*, for use in the central Pacific. Plans have been drawn for new vessels to replace the exploratory fishing vessel *Delaware* in the North Atlantic and the biological research ship *Black Douglas* in the eastern Pacific. A surplus naval vessel, the *Geronimo*, has been converted for use in the tropical Atlantic. Plans are progressing for the construction of the vessels that were funded in 1961.

The need for new and improved instruments is generally recognized as one of the most serious obstacles to overcome in fishery and oceanographic research. To help alleviate this situation, the Bureau recently established an Instrumentation Unit in conjunction with its Biological Laboratory in Washington, D.C. This unit will service Bureauwide needs, represent the Bureau in interagency planning, and negotiate contracts for the development of new oceanographic instruments and equipment.

Fish protein concentrate (FPC) studies.—Three fundamental methods for processing FPC are being studied. The methods use biological, chemical, and physical techniques, and the variations of techniques are quite diverse. Variability in the nutritional quality of the product appears to be the biggest stumbling block in putting FPC on the market.

Following the global survey made of FPC processing methods, it was apparent that the U.S. Government needed to perform further intensive research on certain selected methods. Work has begun on quality control studies of the biological and chemical processes used to manufacture FPC. Processing equipment is being installed in an explosion proof laboratory.

Arrangements were made to have the National Academy of Sciences convene a panel of experts to guide the Bureau's FPC research program. This Academy prepared a report for Secretary Udall answering three basic questions concerning the world's need for FPC. The Academy's report was favorable and stresseed the need for continued FPC research.

Nutritional effects of fish oil.—Preliminary studies conducted under contract by the Hormel Institute of the University of Minnesota have shown that thyroid imbalances cause drastic changes in the lipid components found in blood vessel and other tissues—amounts of polyunsaturated acids in the tissues are significantly reduced before those in the vital centers are affected. When common or saturated fats were included in the diets of the experimental animals, many died from the effects of these imbalances. The polyunsaturated fats of fish oil and corn oil, on the other hand, evidenced a protective effect for the hyperthyroid rats; fish oil was more effective than corn oil. When the rats were hypercholesteremic in addition to being hyperthyroid, the protective effects were even more dramatic. The rates of body growth, feeding efficiencies, and the nature of the aortic lipids of the experimental animals were markedly affected by lipid supplements and hormonal imbalances.

Irradiation pasteurization of fishery products.—The Bureau, in cooperation with the Atomic Energy Commission, continued its research in low-level radiation (pasteurization) of fishery products. The Bureau's Technological Laboratories in Seattle, Wash., and Gloucester, Mass., are studying the possible extension of shelf-life storage of petrale sole, Dungeness crab, haddock fillets, and clam meats, which represent important segments of the fishing industry. Initial bacteriological tests indicate that irradiation inhibits bacterial growth. Vitamin assays and amino acid tests indicate that there are insignificant differences between irradiated and control samples. Similar studies have begun for fillets of cod, pollock, and ocean perch. On the

strength of these initial studies, the Atomic Energy Commission (AEC) plans to build a $600,000 Marine Products Irradiator (MPDR) in Gloucester, Mass. The MPDR is designed to irradiate small semicommercial lots of fishery products and will be in operation in 1965. Bureau personnel and AEC personnel will operate the unit.

Pesticide research.—It has been estimated recently that our national economy loses more than $11 billion annually because of pests. This problem is being met to a remarkable degree by the agricultural chemical industry. In the past 20 years industrial research has marketed more than 6,000 products formulated from approximately 200 basic compounds. The annual sale of pesticides of approximately a billion pounds is valued at more than $300 million.

The effects of pesticide chemicals on fish and shellfish cannot be evaluated easily because of certain attributes. The chemicals have no generalized structural formula by which to identify them as being toxic or nontoxic to marine species. Many are extraordinary and unpredictably specific in their action and may affect differently two closely related groups of animals. Each pesticide, therefore, must be evaluated for its effect on each species. It cannot be assumed that a chemical harmful to one fish is equally harmful to other fish. Some pesticides, relatively harmless in their original condition, become toxic, and thereby useful, through the formation of oxidation products after they are applied. Other chemicals, especially the organic phosphates, may have their toxic properties nullified through combination with some other component in the environment.

Most pesticides tested so far, under laboratory conditions, are toxic to marine animals at levels far below recommended application rates. There are no data to demonstrate that pesticides collect in estuaries following their proper use on farms and forests except in rare situations in which they are intentionally applied directly to brackish waters for the control of weeds and mosquitoes. Toxicity levels may vary with age and species of the fish, formulation of the product, and test conditions. Similar variability may be expected under field conditions.

Current pesticide investigations of the Bureau fall into three phases:

1. Determination of acute toxic levels of the more important chemicals now in use or expected to go into production soon.

2. Observations of possible toxicity due to chronic exposure to relatively low concentrations. This work involves few species and only the most common pesticides, because observation periods extend approximately 6 months. Emphasis is placed on ill effects during early growth of test animals.

3. Evaluation of important chemicals under field conditions. The objectives are to relate laboratory findings to field results under vary-

ing conditions of terrain and weather so that pesticides having minimal effects on commercial fisheries can be identified. It is evident that with careful selection of control agent and proper consideration to methods of application, current pesticide hazards can be lessened.

USDI inspection service improvements.—Changes have been made in the USDI inspection service program for fishery products in order to better satisfy the needs of the fishing industry. The changes are a result of recommendations made at the industry-Government meeting held in June 1961 to discuss the inspection program. Recommendations made by the industry that have been implemented are as follows:

1. Inspection certificates have been redesigned to clearly differentiate between continuous, lot, and unofficial sample inspections.

2. The inspection regulations have been amended thereby streamlining recovery of service costs and achieving a higher degree of uniformity in the assessment of fees and methods of charging.

3. A communication system has been established whereby all proposed inspection policy statements that may affect plant operations are directed to the management of plants for their comments prior to adoption.

4. Regulations have been established concerning the stripping of labels bearing Federal shields from mislabeled products.

Transportation studies.—Two studies on aspects of the transportation of fishery products, contracted for by the Bureau, were completed during the year. One concerns express shipments of fishery products. Shippers in the fishing industry have always depended on a rapid, readily available form of transportation for their less-than-carload shipments. The study was undertaken to help determine the adequacy of the present service, the extent to which the service is used, and the improvements in the service that should be made. Improvement in services have been noted as a result of this study.

The other was a study of ocean freight rates for fishery products. It was made by the General Services Administration. Both domestic and foreign commerce were considered, and many important characteristics of each were revealed upon study of the data.

Transportation proceedings.—The President's 1962 Transportation Message to the Congress requested a competitive atmosphere among carriers. Under such an atmosphere the best and most economical service will be provided fishery product shippers.

The Bureau was active in transportation matters. As required by law, Bureau economists participated in transportation proceedings for industrial fishery products that will result in millions of dollars in savings for industrial fish processors in the next several years. The Bureau and the State of Alaska intervened in regulatory proceedings

concerning water transportation of Alaska's fishery products before the Federal Maritime Administration in opposition to a request for a 10-percent rate increase. Hearings were completed, but settlement has not yet been announced.

Cooperatives.—Rules of procedure for issuance of cease and desist orders under the Fishery Cooperative Marketing Act of 1934 were revised and published during the year. Responsibilities for issuance of such orders under the act will be discharged by the Bureau with legal council provided by the Office of the Solicitor.

Crash promotion program.—The Bureau cooperated with the Maine sardine industry in a "crash promotion program" to facilitate the movement in normal trade channels of an oversupply of canned Maine sardines. In 1961, a disastrous year for the industry, only 754,000 cases of Maine sardines were packed—the shortest in 23 years. Conversely, 1962 was an excellent production year in which over 2 million cases were packed by the industry. Such a large pack overloaded the market, and the price declined.

The Bureau initiated an aggressive consumer- and food trade-education program. More than 30 food trade associations were requested to give their full cooperation in assisting the Maine sardine industry by bringing to the attention of their members the abundance of Maine sardines. Followup contacts were made with the appropriate representatives of the educational media of radio, television, and the newspapers; home economists; dieticians; school-lunch supervisors; in-plant feeders; and others in a position to move large quantities of this item in normal trade channels. The Bureau is continuing its efforts to assist this important segment of the New England seafood industry.

Promotional programs.—The Bureau again cooperated with the commercial fishing industry in a number of industrywide national promotional efforts. Public-service consumer-educational materials were distributed throughout the country to newspaper and magazine food editors, radio and television food personalities and public-service directors, extension specialists, the mass-feeding industry, the retail food trade, and others in a position to publicize and merchandise fishery products. Bureau home economists also appeared on radio and television food shows, stressing the nutritional and health value, ease of preparation, economy, and variety of fishery products. Promotional programs in which the Bureau assisted industry in 1962 included: National "Fish 'n' Seafood Parade," the annual "Scallop Festival," "It's Fish 'n' Seafood Time," "August is Sandwich Month," "Outdoor Fish Cookery," "Shrimp and Rice Fiesta," "The Wonderful World of Tuna," "March is Egg Month," "Maine Seafood Festival," "Seafood for Health and Nutrition," and the "Chive Festival."

Fishery products were included in the list of eligible foods under food stamp programs.

Fish-cookery demonstrations.—As part of the Bureau's continuing program to promote the greater use of seafoods in the American diet, and thereby obtaining better utilization of this important natural resource, Bureau personnel held over 300 fish-cookery demonstrations for television, restaurant operators, institutional dietitians, school-lunch managers, in-plant feeders, extension agents, club leaders, and others in a position to tell the "seafood story." In addition over 500 palatability tests were made for use in developing recipes for consumer and institutional use. There were also yield studies made for inclusion in the USDA Buying Guide.

Fishery educational motion pictures.—Twenty Bureau-produced, and for the most part industry-financed, fishery educational motion pictures are now in national distribution through 193 cooperating film libraries and Government distribution channels. They are viewed annually by over 2 million persons, exclusive of audiences exposed to public-service television showings. Another motion picture, *Watermen of Chesapeake*, was started in calendar year 1961 and is scheduled for completion in the spring of 1963. In 1962 Bureau films received one international and three national awards. Since 1946, 21 international and national film festival awards have accrued to the Department as a result of Bureau-produced films.

Market News Service reporting.—In 1962 Fishery Market News Service completed a quarter of a century of providing the fishing industry of the United States with current information on fishery supplies, movement, distribution, demand, prices, and market conditions. Through daily reports issued in seven important fishery centers, the Fishery Market News Service keeps the buyer and the seller equally advised regarding market information, and the distributor is kept advised on market conditions. The Market News Service reports are issued from Boston, New York City, Hampton, Va. (includes data from Baltimore, Md.), New Orleans, San Pedro, Seattle, and Chicago.

Fisheries Financial Assistance Programs

The Bureau administers three programs that give direct financial assistance to the fisheries. Following is an account of the operations of each for the fiscal year 1962.

Fisheries Loan Program

The Fisheries Loan Program continued operations which began in the latter part of 1956. During the 1962 fiscal year 208 applications totaling $4,059,254 were received, bringing the total since the program

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began to 1,169 for $33,008,423 (Appendix C). One hundred and seven applications for $2,632,502 were approved during the year while 63 applications for $1,334,955 were declined. Approximately 33 percent of the funds were loaned to California fishermen, mostly for converting tuna clippers to tuna purse seiners. As these are among the largest vessels used in the U.S. fisheries and the conversion required considerable structural changes as well as expensive nets, the loans were correspondingly large. The conversion of tuna clippers to tuna purse seiners has revived this segment of the industry to a point where instead of being one of the least profitable fisheries in the United States it has become one of the most profitable.

Fishing Vessel Mortgage Insurance Program

The Fishing Vessel Mortage Insurance Program, which provides for insurance of mortgages given for the construction, reconstruction, or reconditioning of fishing vessels, was continued during fiscal year 1962. During the year nine applications for insurance on $1,611,050 were received. Five were approved for $1,050,346, and four for $550,750 were pending. Considerable interest by banks and insurance companies continued throughout the year.

Fishing Vessel Construction Differential Subsidy Program

This program provides for the payment, under certain very restrictive conditions, of a subsidy equal to the difference between the cost of construction of a fishing vessel in a domestic shipyard and the cost if built in a foreign shipyard, with a maximum limitation of 33⅓ percent of the cost of construction in a domestic shipyard. One of the restrictions is that the vessel must be designed to fish in a fishery which has received a finding of injury or threat of injury by reason of increased imports. In effect this has confined the program to those vessels designed for fishing in the groundfish fishery in New England. Relief for this fishery has been recommended by the Tariff Commission under the Escape Clause of the Trade Agreements Extension Act of 1951, but relief was denied under Section 7(c) of that act. During the fiscal year four applications totaling $409,427 for subsidies for construction of fishing vessels were received from this fishery. Five applications for $495,994 were approved, and two applications for $86,667 were pending at the end of the year.

New Programs

In 1962 the Bureau began two new programs that should benefit the fisheries.

Shellfish Genetic Study

One new program concerns shellfish genetics and is being carried on at the Bureau's Biological Laboratory at Milford, Conn., where

previously techniques for artificial culture of shellfish were successfully developed. Application of these techniques by industry would be greatly encouraged if selective breeding of desirable characteristics in shellfish could be developed. Knowledge of how characters are passed from one generation to the next is very limited for all marine animals. During 1962 research was begun to determine basic genetic principles of shellfish. These studies should lead to development of strains of oysters and clams with such desirable characters as fast growth, disease resistance, and better market quality.

Fishery Commodity Study

A program was established, on commodity lines, to investigate basic conditions and maintain a watching brief on current economic developments in individual fisheries. By assembling and analyzing data pertaining to all aspects of primary production, processing, distribution, and final sale of fishery products, economic trouble spots can be detected in advance of actual occurrence. Given sufficient advance notice, Government and industry personnel will be in a better position to initiate programs and policies designed to alleviate the effects of the difficulties. The information assembled in these commodity studies will be issued at regular intervals in the form of economic situation reports as the program develops.

Meetings

Bureau officials attend meetings for several reasons. One important reason is to help form policy on the future utilization of and wise international regulation of harvesting fishery resources and to safeguard the traditional rights of this Nation's fishermen and support its fishing industry. Through such meetings, the knowledge and views of scientists, researchers, and other fishery experts are brought together towards the common purpose of conserving and developing the resources and enlarging their existing uses. A second reason for meeting attendance is to assist in forming policies that will protect the movement of U.S. fishery products in foreign as well as domestic markets. Since the formation of the Common Market in Europe and the expansion of fishery production of foreign countries, Bureau participation in such international trade meetings has increased. A third and most important reason for meeting attendance is that by this means a great deal of scientific and technical information is exchanged. Professional meetings attended by specialists offer one means of ameliorating the increasing difficulties of communication caused by the great increase of published information. Bureau representatives attend many fishery meetings with Federal, State, and private and professional organizations and profit greatly from the opportunities to exchange information on their scientific activities.

The most significant meetings in 1962 were those in participation with other countries. Some of the important meetings are discussed here.

Fifth International Food Congress and Exhibition

The Fifth International Food Congress and Exhibition, sponsored by the Association International de la Distribution des Products Alimentaires, was held in the United States for the first time at the New York Coliseum, September 8–16, 1962. It was attended by more than 15,000 food trade representatives of which 3,000 were official delegates from some 35 countries. The keynote of the Congress and Exhibition was "Why Food Is a Bargain," and the theme was "The Life Line of Humanity—Food From Farm to Table." The panel discussion participants were of the highest professional caliber, representing top management in the food industry. The seven formal conference sessions covered all aspects of food production, processing, distribution, and merchandising and marketing. Simultaneous interpretations in English, French, German, and Spanish were available to the international audience during these sessions. The 200 commercial exhibits demonstrated how America has achieved the means of growing a sufficiency of food of countless varieties which reaches the people at costs lower than anywhere else in the world. Several Government agencies including the Department of the Interior participated in this Exhibition and demonstrated what is being done to help the developing countries overseas. The Bureau distributed two of its special releases, "Seafood for Health and Nutrition" and "Fish Protein Concentrate—Lifeline of the Future," to official participants and mass media representatives at the Congress. The public attendance at the Exhibition was about one-quarter of a million people.

Great Lakes Fishery Commission Meetings

At the annual and interim meetings of the Great Lakes Fishery Commission in 1962, the lamprey-control programs carried out by the two research agencies of the Commission was thoroughly reviewed. Biologists of the Bureau of Commercial Fisheries reported that the spawning lamprey population had been reduced 85 percent over the previous year. The Fisheries Research Board of Canada also presented statistics to show that a substantial reduction of lamprey spawners occurred in Canadian waters. There was general agreement that the chemical control program is successful.

Major decisions reached at the meetings were:

1. First priority is to be given to maintaining control of sea lamprey populations in Lake Superior.

2. Treatment of streams on the eastern side of Lake Michigan was authorized.

3. The commercial fishery for lake trout in Lake Superior is to remain closed except for a limited fishery for biological purposes.

4. Long–range research plans for each of the Great Lakes are to be completed by June 1963.

5. The Commission will prepare letters for transmittal to the Department of State requesting that regulatory authority be transferred from the State legislatures to appropriate fishery agencies in the States of Michigan, Ohio, and Minnesota.

Inter–American Tropical Tuna Commission

The 1962 meeting of the Inter-American Tropical Tuna Commission was held at Quito, Ecuador, May 16–18. This was a momentous meeting, for a decision was taken to recommend a catch quota of 83,000 tons of yellowfin tuna annually in waters covered by the Tuna Conventions Act of 1950. It is the first catch control measure adopted by the Commission, and it was decided upon only after exhaustive examination of scientific evidence that the quota represented the maximum sustained yield from the yellowfin stocks. Putting the quota into effect awaits appropriate action by governments of countries whose fleets fish tuna in convention waters.

U.S.–Japan Tuna Conference

At the request of the Japanese Government, the Second United States-Japan Tuna Conference met in Tokyo from October 9 to 13, 1962. Among the subjects discussed were the current trend in tuna production, the tuna resources, biological and oceanographic information, research programs and administrative measures, expanded utilization of tuna, and measures to improve the exchange of information. With respect to the tuna market, the current trend and outlook for tuna trade were considered. Many frank exchanges of views contributed to a better understanding of problems of resource utilization and trade expansion. The delegations consisted of government and industry representatives. The Japanese delegation requested that regular meetings on tuna be held in the future.

International Commission for the Northwest Atlantic Fisheries

The 12th annual meeting of the International Commission for the Northwest Atlantic Fisheries (ICNAF) was held in Moscow in May and June 1962. Several issues of importance to the objectives of the Commission were discussed. These included the status of the resources and evidence for the success or failure of the present conservation measures. Progress was made in achieving more effective regulations. Better agreement was reached on the joint enforcement of the regulations, thus putting all member countries on a more equal basis in respect to their observance. The advisability of imposing

gear regulations in the scallop fishery was carefully considered. The inclusion of herring in the Commission's program was an important advancement. Progress was made toward inaugurating a comprehensive oceanographic program in the areas of special concern to ICNAF countries. Some hope now exists for finding a solution to the hazards to vessels and gear caused by the very intense fishing on Georges Bank. The use of lights and radar reflectors on drifting gear was agreed to. The U.S.S.R. asked for admittance to Panels 4 and 5 in order to participate in research and discussions concerning these two areas. Poland now participates in panels for two of the five areas, and U.S.S.R. in all five panels.

International Congress of Food Science and Technology

The first International Congress of Food Science and Technology, which was held in London during September 1962, may rightly be looked upon as a milestone in the history of food technology. Most important was the fact that the Congress afforded an opportunity for individual scientists working in all fields of food technology, and from most of the nations of the free world, to present the results of their research to their peers for discussion and analysis.

Approximately 2,000 scientists attended the Congress, two of whom represented the Bureau of Commercial Fisheries. Scientific papers were presented on many aspects of fishery technology. Sessions on microbiology of fish and the chemistry of fish oils were of particular interest to Bureau personnel. Tentative microbiological standards for this product were established during a special session on the microbiology of fish protein concentrate scheduled by representatives of the Food and Agriculture Organization of the United Nations.

International Institute of Refrigeration Congress

The 11th Congress of the International Institute of Refrigeration was held in Washington, D.C., from August 20 to 25, 1962. Approximately 200 participants attended. This international organization is comprised of scientists and engineers interested in refrigeration research and its application. Commission 4 of this organization is concerned with the refrigeration of food and thus was of particular interest to the fishing industry and Bureau scientists.

Bureau personnel were instrumental in arranging for a separate fishery session that featured articles dealing with frozen seafoods. Of value to the American fishing industry and to the Bureau's program was information presented on (1) quality changes in fresh and frozen fish and in precooked seafoods, (2) development of fish–freezer trawlers in Europe, and (3) calculation of the freezing times of fishery products.

International North Pacific Fisheries Commission

The International North Pacific Fisheries Commission was created by treaty with Japan and Canada in 1953, the International Convention for the High Seas Fisheries of the North Pacific Ocean. This is regarded as the most critical and significant treaty commitment of the United States in the fisheries. Renewal or renegotiation will be possible upon 1 year's notice by any party at the conclusion of a 10-year period in June 1963. The Japanese have indicated their intention to renegotiate on a basis more favorable to themselves. This poses an increased threat to Alaska's stocks of salmon, halibut, and king crab. Annual meetings of the full Commission and advisory staffs are held successively in October and November in Seattle, Tokyo, and Vancouver, B.C. Interim meetings are held occasionally to discuss specific problems. In addition, the American Section meets twice a year, in winter and early autumn, and study groups are occasionally called to consider specific problems.

International Whaling Commission

The 14th meeting of the International Whaling Commission was held in London in July 1962. Observations on the conditions of the stocks of whales made by the Scientific Committee were sent to the Commission. The catch-per-unit-of-effort records indicate that world whale stocks, particularly those in the Antarctic, are at a dangerously low level. The stocks of the five commercially important whales—blue, fin, humpback, sei, and sperm whales—could be almost completely destroyed unless several restrictions were placed upon the harvest of these species.

North Pacific Fur Seal Commission

The sixth annual meeting of the North Pacific Fur Seal Commission was held in Washington, D.C., from November 26 to December 3, 1962. The Commission, composed of representatives from Canada, Japan, the U.S.S.R., and the United States, has as its major responsibility the investigation of the fur seal resources of the North Pacific Ocean to determine the measures which will make possible the maximum sustainable yield from these resources, with due regard for their relationship to the productivity of other living marine resources in the area.

The most important issue discussed at the meeting was the method of sealing best suited to achieve this objective. In determining the best method, the Commission reviewed the results of its fur seal research from 1958 to 1962. These scientific investigations dealt with the dynamics of the fur seal populations, distribution and migration at sea, feeding habits, and harvesting methods.

The Commission considered the current scientific knowledge of fur

seals and the present technology of land and pelagic sealing. It recommended to the member Governments that land sealing, when carried out under strict government control and in accordance with appropriate measures regarding the size, sex, and age composition of the seasonal kill from a herd, is the method best suited to achieve the objectives of the convention. The Commission also recommended that research be continued on the methods of sealing as well as other measures necessary to achieve the objectives of the convention.

Plans were formulated for fur seal investigations during 1963. Research at sea will be designed to obtain additional information on intermingling, distribution, abundance, and food habits of the herds. On land the scientists will concentrate on studies of sizes, changes, and trends in fur seal populations.

World Scientific Meeting on the Biology of Tunas and Related Species

The United States was host to the FAO World Scientific Meeting on the Biology of Tunas and Related Species in July 1962 at La Jolla, Calif. This meeting was attended by 249 scientists and industry members from 18 countries and 8 international organizations. Bureau scientists played a key role in planning it. The meeting was concerned with the assessment of present knowledge and also information needed by biologists in the future for the conservation of this valuable world resource.

Twenty–four resolutions were adopted at the meeting. One recommends the formation of a West African Tuna Commission; another, the appointment of a continuing Tuna Research Committee to coordinate and promote tuna research on a worldwide basis; and a third, the collection and compilation of tuna catch statistics on a world basis.

Cooperation and Coordination With International, Federal, State, and Other Agencies

In efforts to obtain maximum utilization of its resources of research talent and facilities, the Bureau cooperates with and coordinates its programs with those of various foreign governments, other Federal agencies, States, universities, and private agencies. This cooperation and coordination is effected through international agreements and treaties, formal and informal arrangements with Federal agencies, State conservation departments, universities, and private associations.

A prime example of effective cooperation at the international level in 1962 was the Bureau's efforts to obtain all known scientific data on the production of fish protein concentrate (FPC). The UNICEF and FAO divisions of the United Nations helped the Burean obtain the data from 22 different foreign countries. Thus for the first time,

the research results of scientists throughout the world have been compiled for future studies in this important field.

A working group meeting, sponsored by the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific, and Cultural Organization (UNESCO), was held in Washington, D.C., at the National Oceanographic Data Center from June 20 to 23, 1962, to plan the research program of the International Cooperative Investigations of the Tropical Atlantic (ICITA). The investigations are the outgrowth of the Tropical Atlantic Oceanography Fishery Program, proposed by the Director of the Bureau of Commercial Fisheries in March 1961 and endorsed by the Interagency Committee on Oceanography (ICO) of the Federal Council for Science and Technology. The formal recommendation for the survey of the tropical Atlantic was made by the Bureau on April 11, 1962, to IOC and was endorsed by that agency. Participating in the Working Group meeting were representatives from 14 foreign countries, international organizations, and a number of universities.

Recommendations of this working group were concerned with (1) physical, chemical, meteorological, and geological studies; (2) biological studies; and (3) exchange and publication of data and preparation and publication of an Atlas. Plans were laid for three synoptic cruises, involving 15 vessels. The first portion of the survey (Equalant I), February 15 to April 3, 1963, includes two 15-day synoptic cruises over a pattern of stations from South America to Africa between the latitudes 15° S. and 15° N. and a 15-day cooperative buoy program by U.S.S.R. and Woods Hole Oceanographic Institution vessels. The second portion (Equalant II), August 1–15, 1963, involves a third synoptic cruise in the same area as that for Equalant I. Research ships and scientists of the Bureau of Commercial Fisheries will play an important role in these investigations. Nine other U.S. agencies, nine foreign countries, and five international organizations will join with the Bureau in this undertaking. In addition to increasing our basic knowledge of the oceanography of this little known region, information will be obtained that will aid in the harvesting of fishery resources and in feeding the peoples of protein-deficient countries bordering both sides of the tropical Atlantic.

In the field of international cooperation, the Bureau through its Branch of Statistics furnishes catch data to the Food and Agricultural Organization of the United Nations (F.A.O.). Catch and effort data are also furnished to the International Commission for the Northwest Atlantic Fisheries (ICNAF).

The Bureau cooperates closely with a number of national, regional, and local fishery and allied trade associations. Such cooperation

embraces virtually all research, development, and service functions of the Bureau.

The Bureau functions in its formal agreements with States through commissions, such as the Atlantic States Marine Fisheries Commission and the Gulf States Marine Fisheries Commission. Interstate commissions coordinate the research efforts and conservation actions of the several States involved in such compacts. This coordinated action is largely based on scientific data provided by Bureau researchers.

The Bureau has cooperative arrangements with all of the coastal and inland States having commercial fisheries in the collection and compilation of statistical data on the catch and operating units of their commercial fisheries.

Formal and informal agreements exist between the Bureau and other Government agencies—the Atomic Energy Commission (AEC), Federal Trade Commission, Department of State, Department of Agriculture, Department of Health, Education, and Welfare (HEW), Weather Bureau, and various defense agencies.

Through cooperation with such organizations as the Agency for International Development (AID), formerly the International Cooperation Administration (ICA), the Bureau of Commercial Fisheries has made significant contributions to the developing nations in the fisheries field. Bureau specialists have participated in surveys to establish a basis for sound economic development of fishery resources of Latin American and African countries. In 1961 surveys were made of Dahomey, Nigeria, Ghana, Liberia, Ivory Coast, Sierra Leone, Senegal, and Panama. A number of the survey team's recommendations were accepted by the governments of the African countries and have been implemented. Fishery development programs were suggested to the Panamanian Government and were put into effect in slightly more than a year's time. The result was the initiation of a cooperative spiny lobster survey with AID during 1962. Actual exploratory operations commenced shortly after the 72-foot, chartered, Gulf-shrimp vessel *Pelican* arrived in Colon, Republic of Panama, in late August. Exploratory cruises were carried out off the Pacific and Caribbean coasts, and significant quantities of spiny lobsters were taken on the Pacific side. The cooperative survey is scheduled for completion in July 1963.

Similar surveys by Bureau personnel were recently conducted in Egypt and are now being accomplished in Brazil and Guatemala. Reports on the fishery potentials of these countries, together with recommendations for development and utilization, will be submitted. The increasingly important role of fisheries in the economics of developing nations is recognized by the Bureau and the skills of its scientific and technical personnel will continue to be made available to provide assistance.

In the 17 months since the Area Redevelopment Program activities began in the Department, Bureau personnel have played an important part in developing, reviewing, and recommending industry project proposals originating in depressed areas. Overall, about 56 percent of all project proposals involving commercial fisheries, on a dollar requested basis, has been approved by the Area Redevelopment Administration (ARA).

Fishery, whale, and seal law-enforcement activities were carried out separately and in cooperation with the U.S. Coast Guard in Alaska, the Pacific Northwest, and New England in fulfillment of obligations imposed by international fisheries conventions.

The cooperative study between the Bureau and the Atomic Energy Commission concerning deepwater marine resources off the coasts of Oregon and Washington was continued during 1962.

The management of the Pribilof Islands fur seal herd and the maintenance of the two native communities has involved cooperative arrangements with the Coast Guard, Bureau of Indian Affairs, Weather Bureau, Federal Aviation Agency, Public Health Service, and the State of Alaska.

The Bureau is responsible for the general administration and coordination of the Columbia River Fishery Development Program, which is a cooperative endeavor involving the fish and game agencies of Washington, Oregon, and Idaho, as well as the two Bureaus of the Fish and Wildlife Service. Cooperative arrangements are developed with the Bureau of Reclamation, Corps of Engineers, and other Federal and State agencies, as appropriate.

The Bureau also cooperates with a number of Federal agencies, among which is the Bureau of Census, in the collection of statistical data on fish oils.

The Bureau also made extensive use of the professional talent and research facilities of a number of universities, State agencies, trade associations, and private organizations by contracting with such groups to supplement Government research and service activities and by awarding research grants for graduate students. Appendix D lists the organizations with which the Bureau had formal contractual arrangements in 1962.

Organization, Employment, Budget, and Physical Property

Organization

In 1962 there were no organizational changes either in the Bureau of Commercial Fisheries' Headquarters Office in Washington, D.C., or in the regions and areas in the field. A chart of the Bureau's organization is shown in Appendix E, and a map of the five regional and two area offices and the territory under each is shown in figure 1.

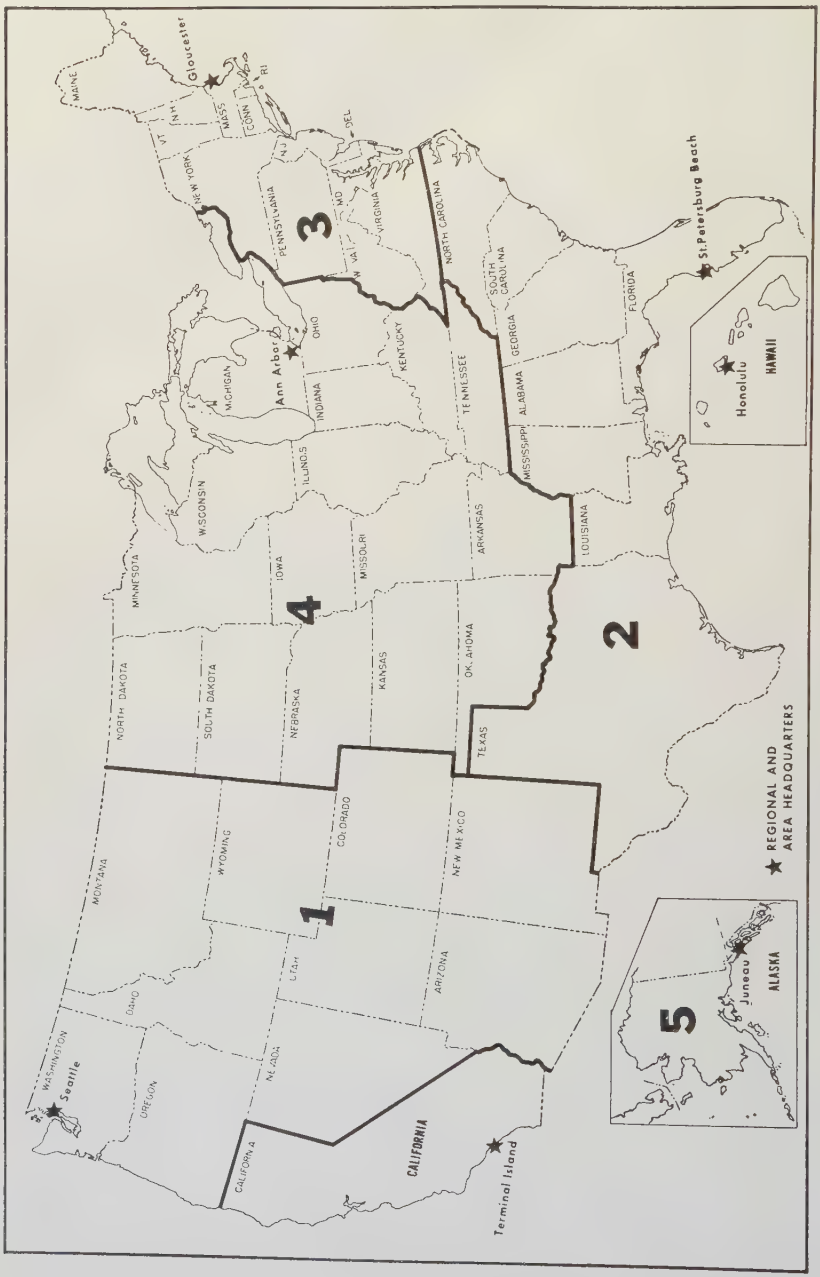

FIGURE 1.—Regions and areas, Bureau of Commercial Fisheries.

Employment

The total employment for the Bureau of Commercial Fisheries averaged 1,906 throughout calendar year 1962. Of this total average, 1,638 were permanent and 268 were seasonal employees. The peak employment for the year was reported at the end of July, at which time the staff had 1,641 permanent and 539 seasonal employees, making a total of 2,180. The variations in the number of employees throughout the year and the relationship between the total number and the number of permanent employees and seasonal, or temporary, employees are shown in figure 2.

Bureau employees fall generally into four broad categories. Of the total of 1,798 full-time employees reported as of October 31, 1962, 772 were classified in approximately 35 professional and technical series; 257 in 16 subprofessional series; 445 in 35 clerical and administrative series; and 324 were in positions, the pay of which is determined outside of the Classification Act (125 vessel employees and 199 custodial employees). Figure 3 shows the grade structures for the professional and technical series, subprofessional series, and the clerical and administrative series and the number of employees in each grade for these three classifications as of October 31, 1962. The percentage of the total number of full-time employees in each of these four categories as of October 31, for each of the 5 years 1958–62 is shown in figure 4. The percentage of the total number of full-time employees in each grade under the Classification Act as of October 31, for each of the 5 years 1958–62 is shown in figure 5.

Budget

For the fiscal year 1962, $31.4 million were available to carry out the Bureau's program (Appendix F). Of this amount, $23.6 million were from annual appropriations; $5 million from Public Law 466 (known as the Saltonstall-Kennedy Act) funds; $0.7 million made available to the Bureau by the Great Lakes Fishery Commission; and $0.4 million from members of the fishing industry for inspection and grading of fishery products.

Physical Property

Field laboratories and stations, vessels, and installations on the Pribilof Islands are the principal properties of the Bureau (Appendix G). In the calendar year 1962 there were 27 large laboratories and installations, 74 smaller stations and offices, and 29 vessels of 40 feet and longer. Two new field research stations for biological research were put into operation at Tiburon, Calif., and Weiser, Idaho. Figures 6, 7, and 8 show the Bureau's principal fishery biological research laboratories, and figure 9, the principal exploratory fishing and gear research and technological laboratories. Besides the fishery oceano-

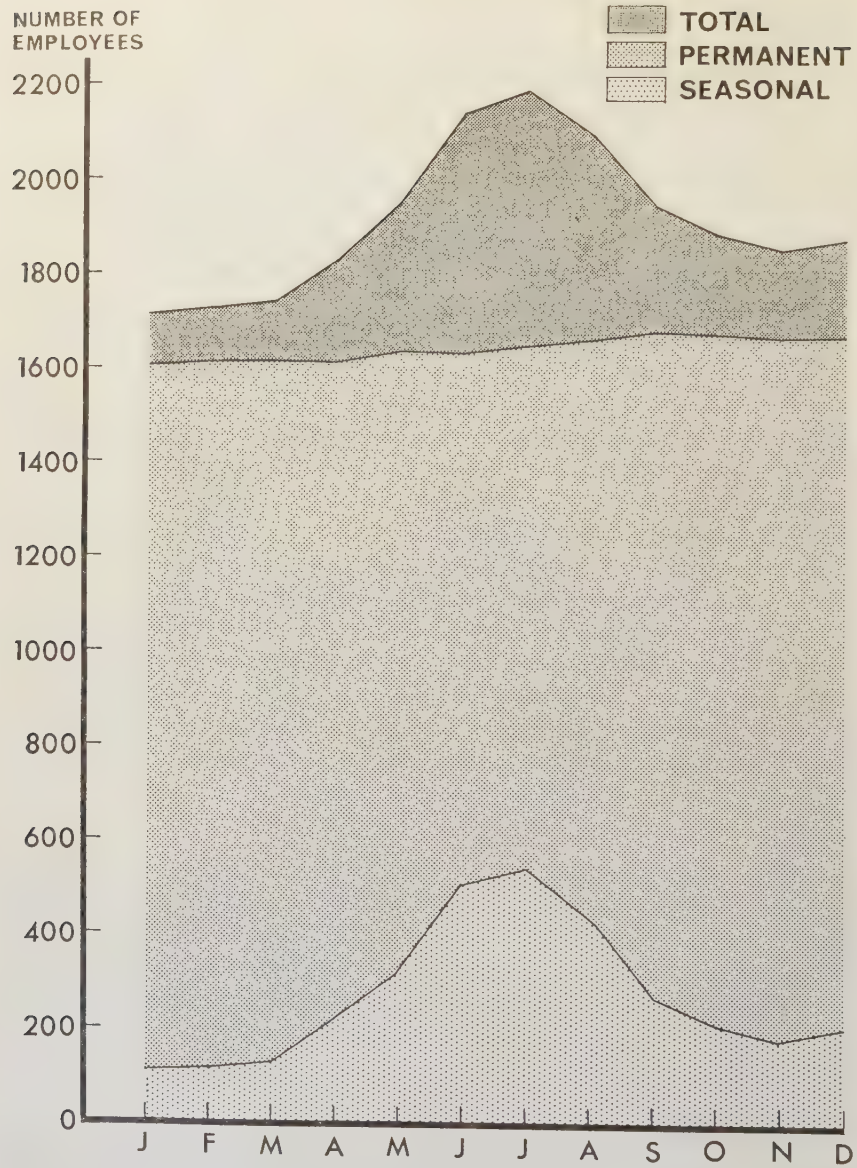

FIGURE 2.—Bureau of Commercial Fisheries employment totals by month, calendar year 1962.

graphic research vessel *Albatross IV*, the construction of which was completed in the fall of 1962, the Bureau acquired two other vessels—the *Geronimo*, an ocean-going tug from the Navy, converted to a fishery-oceanographic research vessel for the purpose of taking part in the tropical Atlantic investigations, and the *Geo. B. Kelez* from the Army, converted for high seas salmon investigations and oceanog-

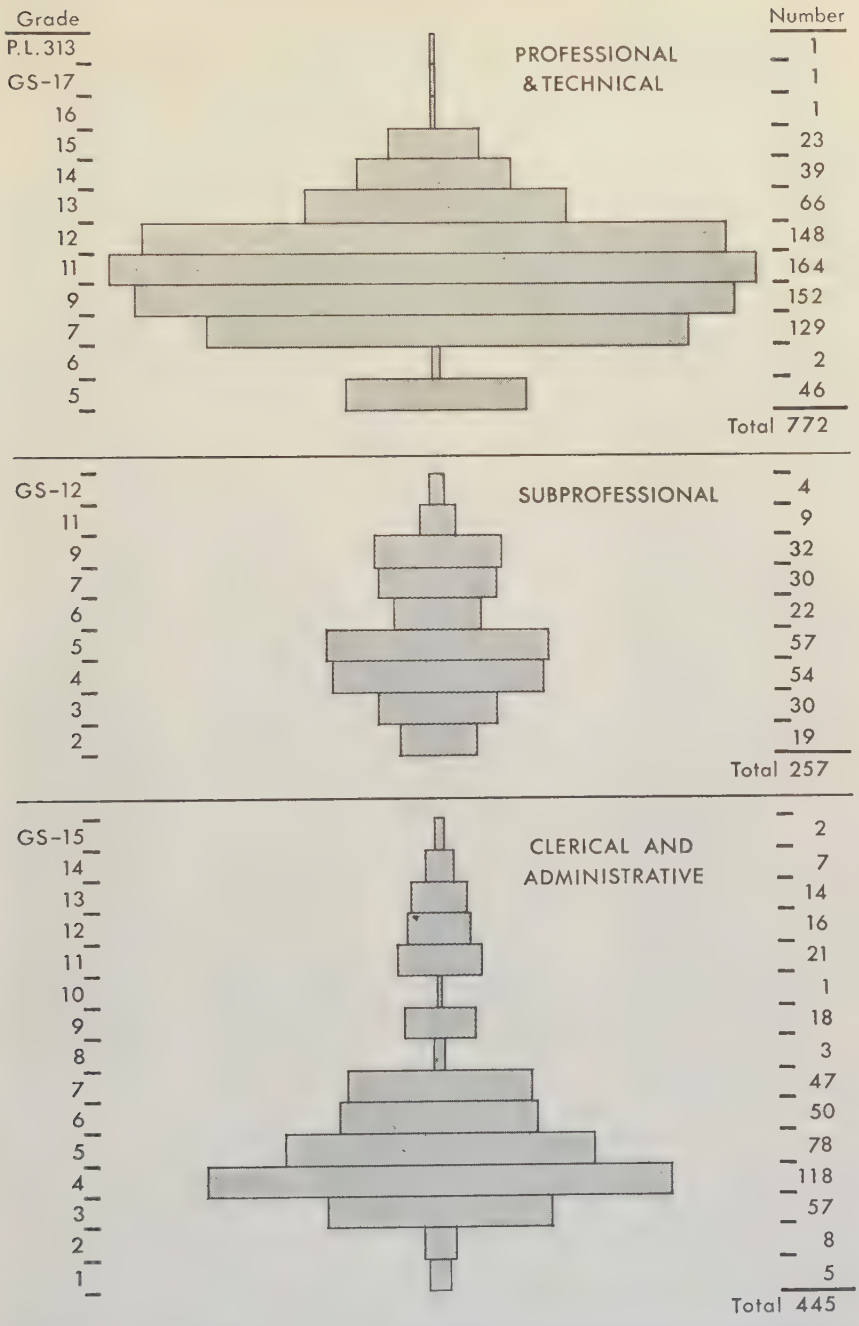

FIGURE 3.—Distribution by grade of professional and technical, subprofessional, and clerical and administrative employees, Bureau of Commercial Fisheries, October 31, 1962.

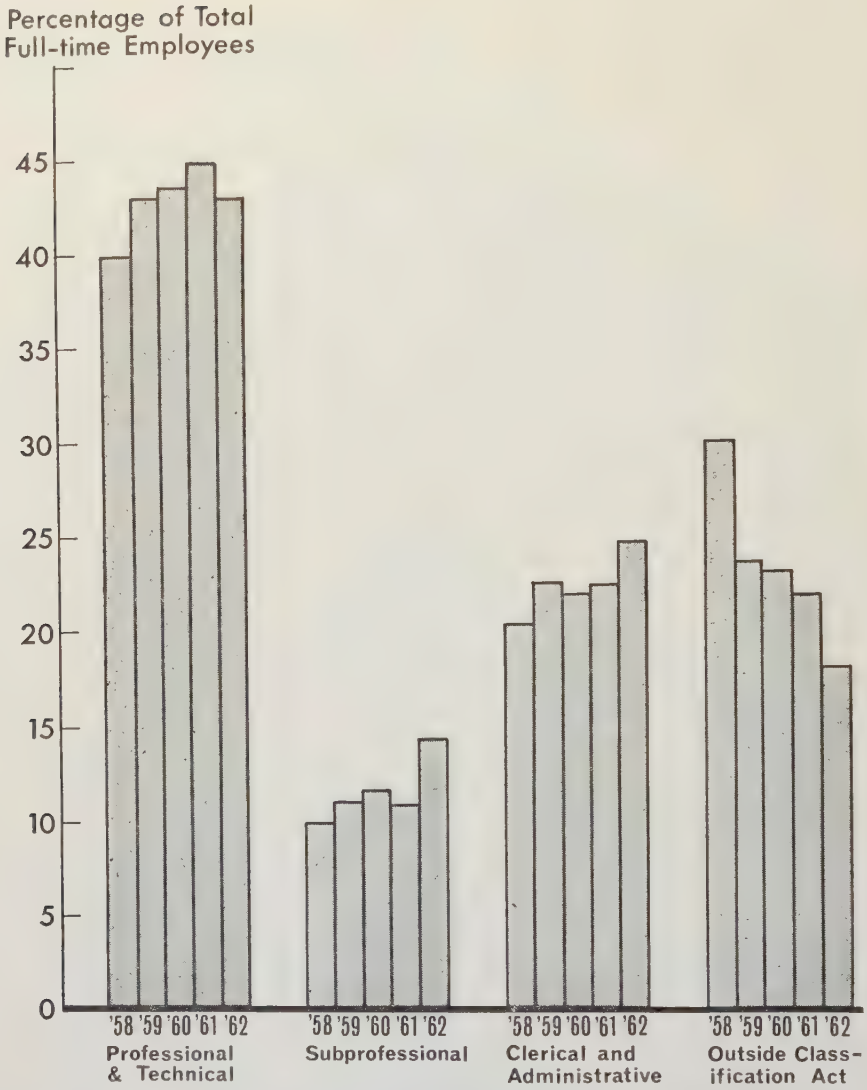

FIGURE 4.—Percent distribution by category of full-time employees, Bureau of Commercial Fisheries, October 31, 1958–62.

raphy. These three vessels and the Bureau's other principal fishery research vessels are shown in figures 10 and 11. The two vessels *Q–91* and *Q–100*, which had been on loan to the State of North Carolina, were determined surplus to the needs of that State and to all agencies of the Department of the Interior. The *Q–91* at the request of the U.S. Army and General Services Administration (G.S.A.) was transferred back to the U.S. Army on April 23, 1962. The *Q–100* at the request of the G.S.A. was transferred to the Agency for International Development (AID) on May 15, 1962.

In fiscal year 1962 a number of replacements and improvements of Bureau research facilities were begun.

A design contract for a new research laboratory at La Jolla, Calif., was awarded in May 1962. Preliminary studies and engineering services were provided by the Department of the Navy, Bureau of Yards and Docks. The new laboratory will house research groups now located in temporary quarters on the campus of Scripps Institution of Oceanography at La Jolla and in surplus Navy barracks at Point Loma. This new building will provide facilities for investigations of genetics, survival, behavior, distribution, movements, and abundance of sardines, tunas, and associated species. It will also establish a fishery oceanographic center suited to carry out the provisions of the National Oceanographic Program. Construction is expected to commence in May 1963, and the construction cost, including collateral equipment and supporting facilities, is estimated at $1,900,000.

A design contract for a new fishery laboratory at Seattle, Wash., was awarded in May 1962. This contract includes preliminary plans and schematic drawings. The laboratory will be the headquarters for oceanographic and biological research on the high seas of the North Pacific Ocean and for the national program for research on fish passage problems and behavior of anadromous species. The new structure will house research groups now occupying rented and inadequate space in the Seattle area. Construction is expected to commence in May 1963, and the construction cost is estimated at $1,830,000.

The design of a new research laboratory at Ann Arbor, Mich., is underway. Preliminary studies include a feasibility study, surveys, and engineering work in connection with acquisition of the required land. The new laboratory will house research groups now located in temporary quarters. Construction is expected to commence in May 1963, and the construction cost is estimated at $1,288,800.

Improvements to the Navy Yard Annex in space occupied by the Biological Laboratory, Washington, D.C., commenced in June 1962. The work consists of alterations to the first and second floors of Building #74, at a cost of $153,000.

The design of salt-water ponds, sea-water systems, boat basin and service building at the Biological Laboratory, Oxford, Md., is underway this fiscal year. Completion of design and award of construction contract are expected in early spring 1963. The estimated construction cost is $150,000. This facility will provide for investigations of genetics and diseases of marine animals as part of the National Oceanographic Program.

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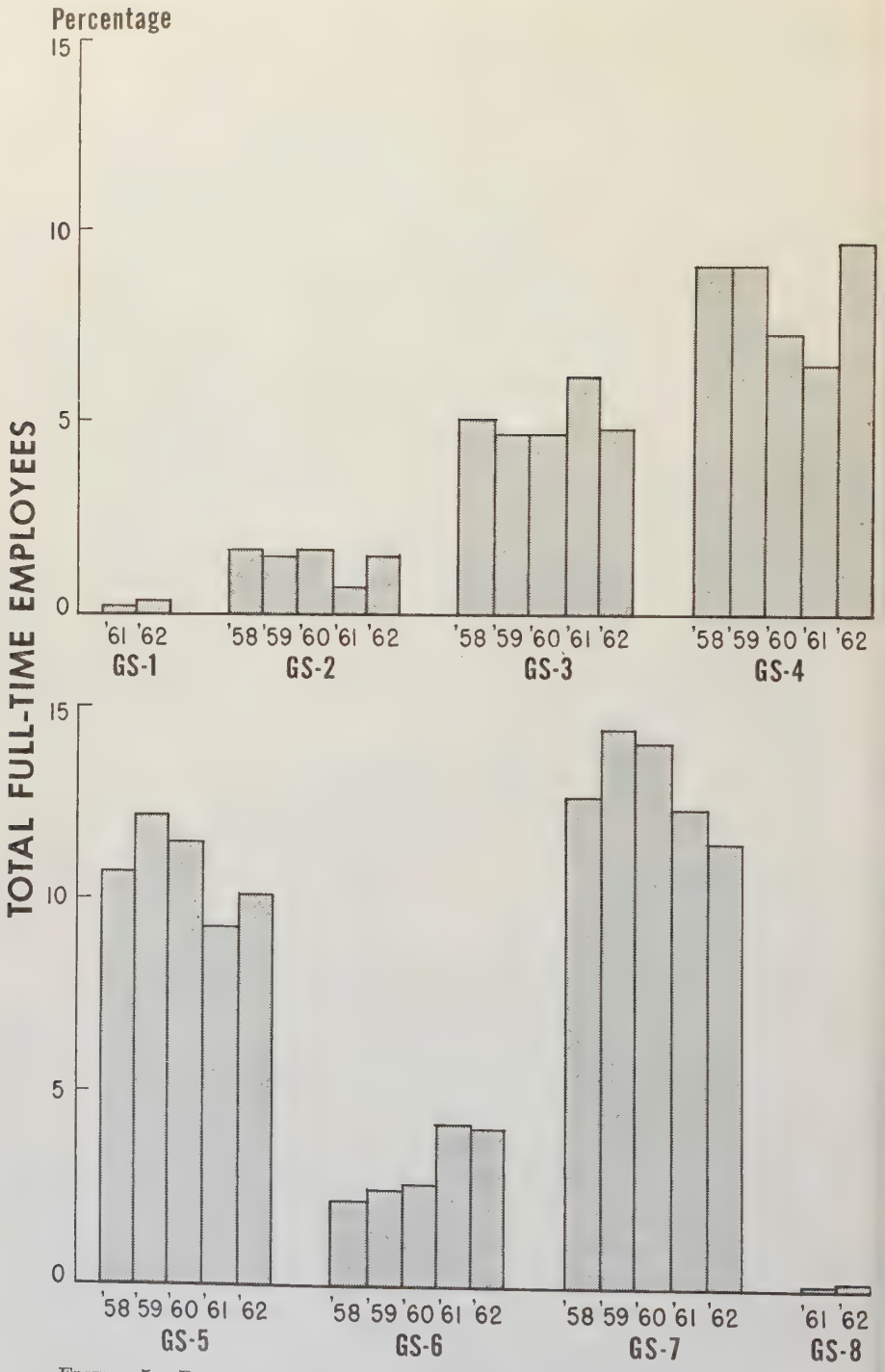
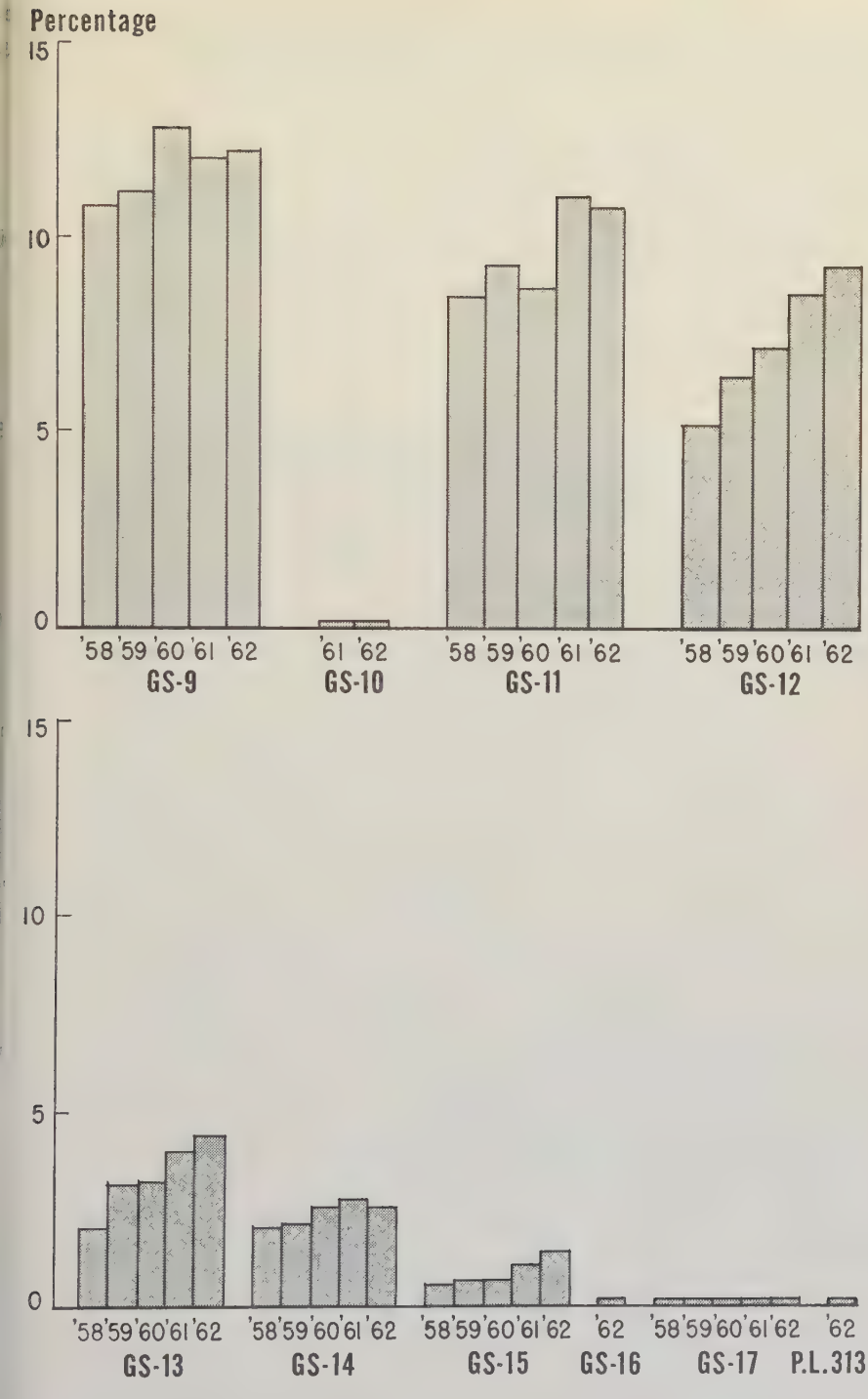


FIGURE 5.—Percent distribution by grade of full-time employees, Bureau of Commercial Fisheries, October 31, 1958–62.


Percentage
15
10
5
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'58 '59 '60 '61 '62
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GS-15
'62
GS-16
'58 '59 '60 '61 '62
GS-17
'62
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The design of a garage-shop building, including heating and storage facilities at the Biological Laboratory, Boothbay Harbor, Maine, was completed this fiscal year, and a construction award was made in June 1962 at a cost of $64,000.

A contract for design of a fishery research vessel to replace the *Delaware* was awarded in February 1962. The new vessel is needed to fulfill our requirements for work on the Continental Shelf in the National Oceanographic Program and for solution to problems of the fishing industry in gear development and methods. Construction is expected to commence in June 1963, and the construction cost is estimated at $1,036,000.

Publications

Publications are an important means for reporting the results of the Bureau's many activities. The scientific community and the public judge the Bureau's competency largely by the quality of its published reports; consequently, considerable effort is expended to maintain high standards for Bureau reports.

Exclusive of the 5-times-a-week Fishery Products Reports issued by the seven Market News Service field offices, a total of 781 publications (11,417 p.) were sponsored by the Bureau in 1961. In the Fish and Wildlife Service series were published 538 reports (9,054); the remaining 241 (2,353 p.) appeared in non-Service journals and series. Bureau personnel wrote most of the reports; some were written by unpaid collaborators or members of research institutes under contract.

It is possible to divide the 1962 publications into four principal classes that reflect the audiences for which they were written. First, are the statistical reports that deal with fisheries; more than 51 percent of the 1962 publications were statistical reports. Second, are the publications that represent contributions to scientific knowledge; 26 percent of the 1962 reports fell in this class. Third are the publications that are written for the commerical and industrial audiences; 15 percent would appeal to such groups. Fourth are the popular articles that are written for the general public; 8 percent were in this class.

Appendix H presents a description and partial list of 1962 publications.

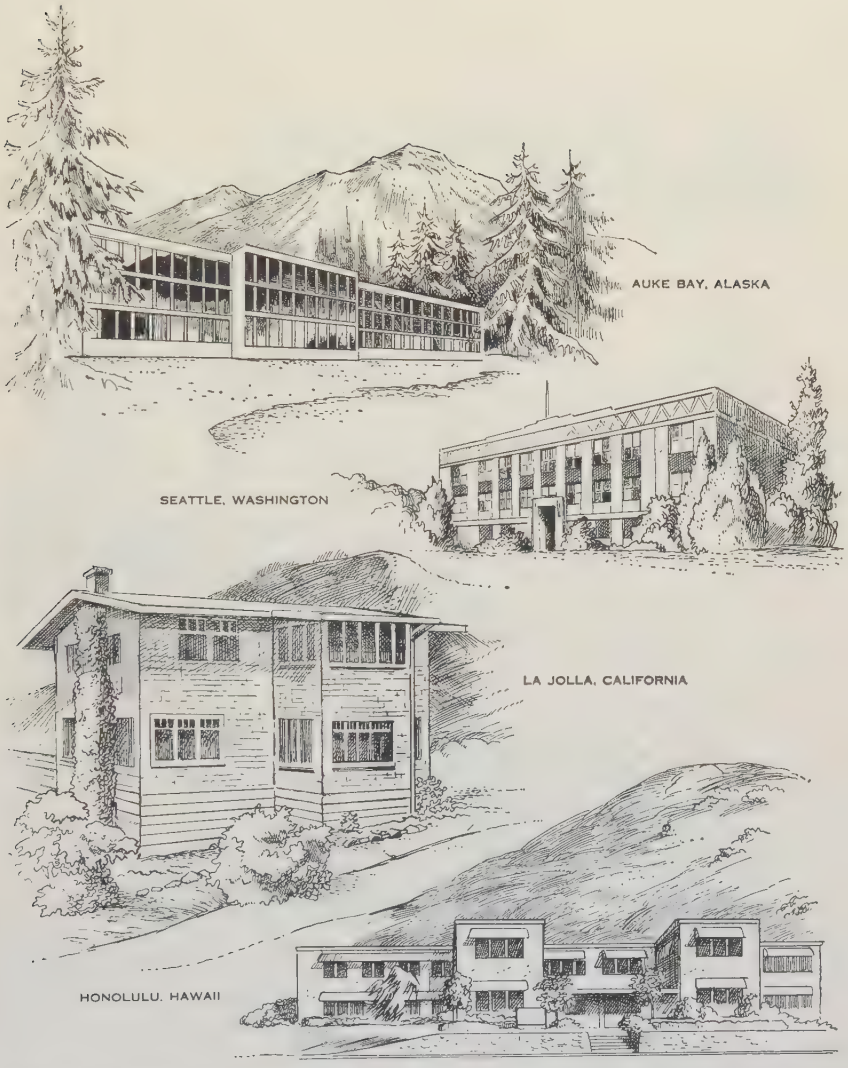


FIGURE 6.—Bureau of Commercial Fisheries biological laboratories, Pacific, 1962.

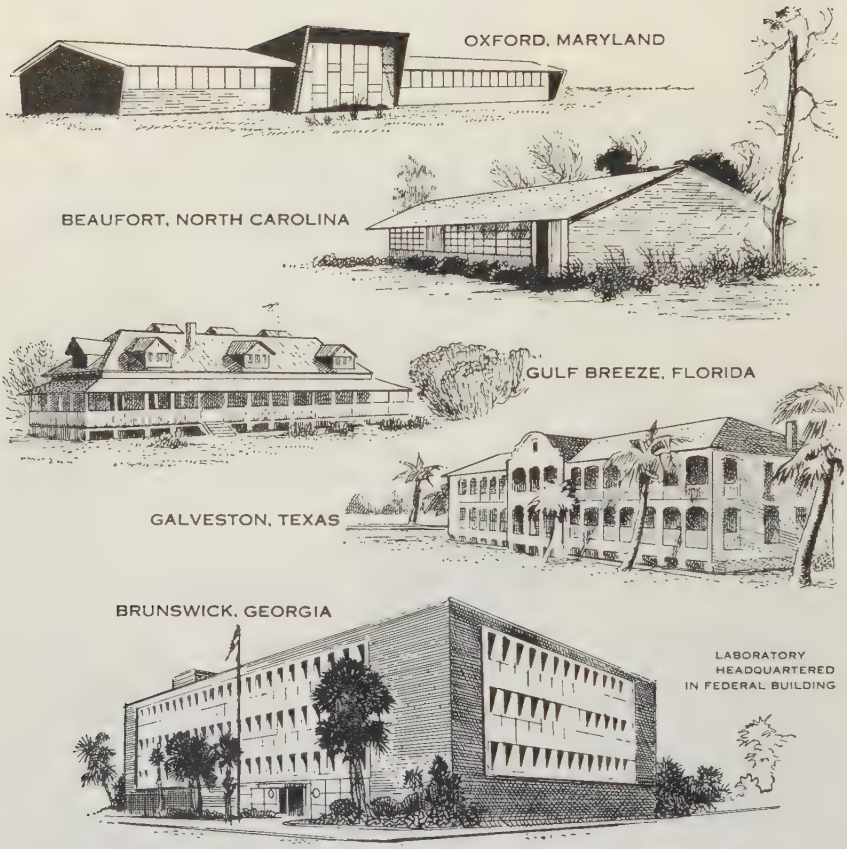


FIGURE 7.—Bureau of Commercial Fisheries biological laboratories, Middle and South Atlantic and Gulf Coast, 1962.

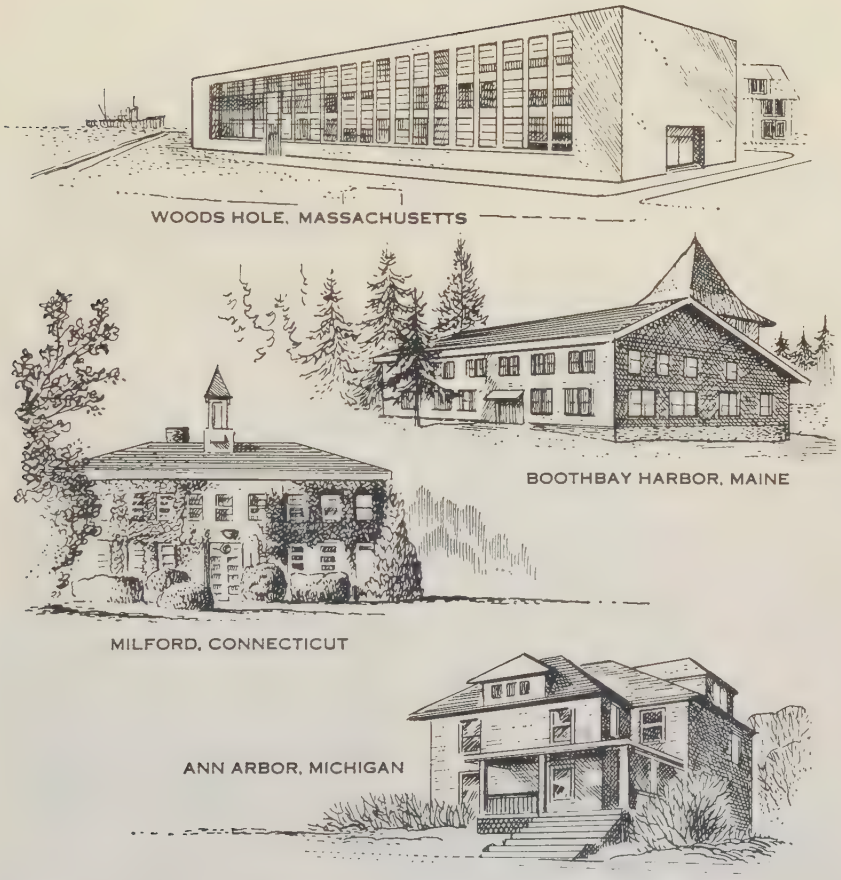


FIGURE 8.—Bureau of Commercial Fisheries biological laboratories, North Atlantic and Great Lakes, 1962.

FIGURE 9.—Bureau of Commercial Fisheries exploratory fishing and gear research and technological laboratories, 1962.

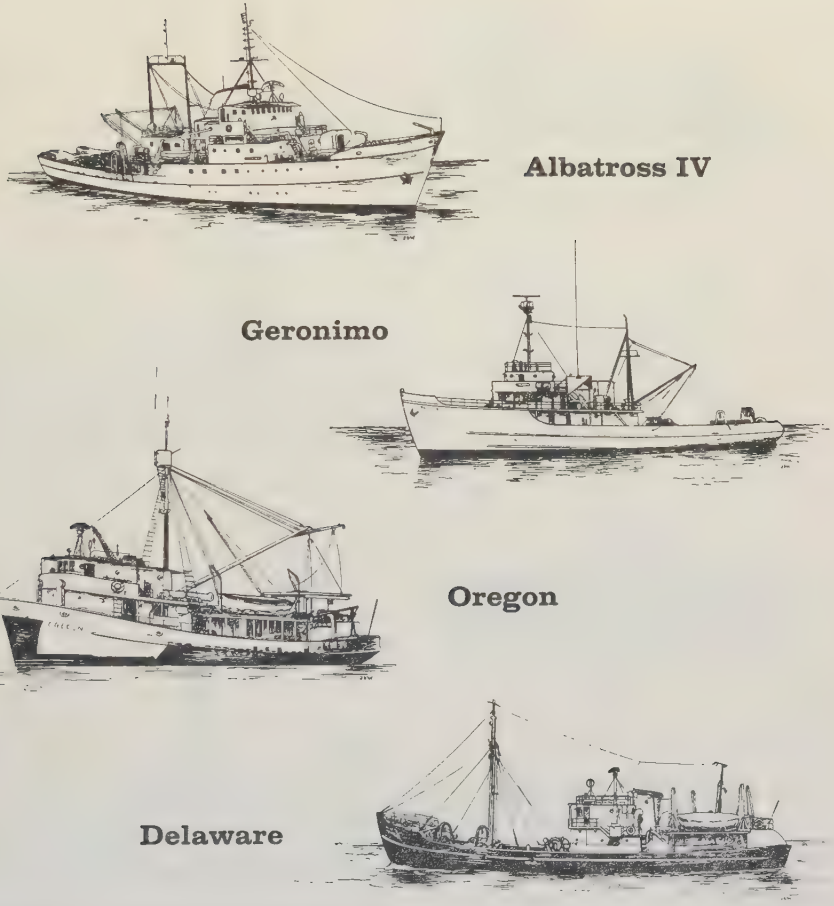


FIGURE 10.—Bureau of Commercial Fisheries principal research vessels operating in the Atlantic in 1962.

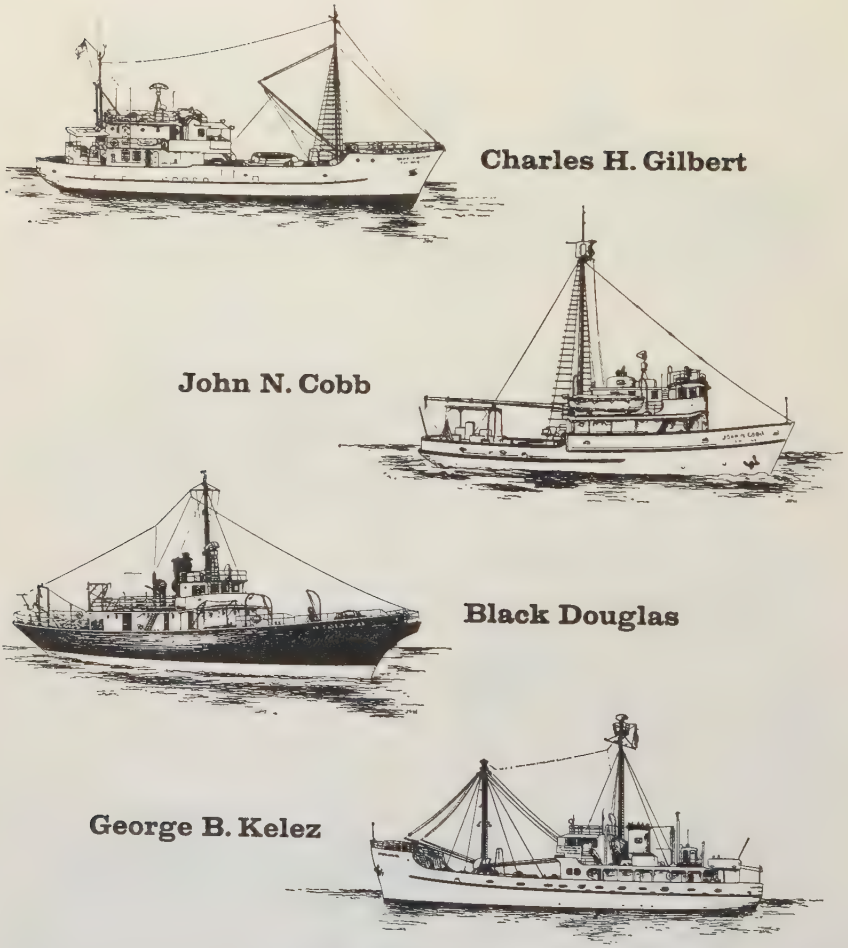


FIGURE 11.—Bureau of Commercial Fisheries principal research vessels operating in the Pacific in 1962.

Appendix A—Fisheries of the United States

A–1.—*U.S. catch, calendar years 1962, 1961, and record year*

Species	1962		1961		Record catch	
	Million pounds	*Million dollars*	*Million pounds*	*Million dollars*	*Year*	*Million pounds*
Menhaden	2,348	26	2,315	26	1962	2,348
Salmon	315	56	310	52	1936	791
Tuna	312	45	326	42	1950	391
Crabs	234	19	232	17	1962	234
Herring, sea:						
Atlantic	158	2	58	1	1902	201
Pacific	42	1	54	1	1937	263
Total	200	3	112	2		
Shrimp	191	73	175	52	1954	268
Flounders	155	14	133	13	1962	155
Haddock	134	11	134	10	1929	294
Ocean perch, Atlantic	124	5	132	5	1951	258
Whiting	105	2	101	2	1957	133
Jack Mackerel	90	2	98	2	1952	147
Alewives	58	1	56	1	1908	90
Oysters	56	29	62	33	[1] 1908	152
Clams	54	12	50	12	1962	54
Halibut, Pacific	54	12	53	8	1915	67
Cod, Atlantic	47	3	47	3	1880	294
Other	877	83	851	82		
Total	5,354	396	5,187	362		

[1] First year in which an oyster survey was made in all regions.

A–2.—*Production of certain manufactured fishery products, calendar years 1962 and 1961*

Item	1962	1961
	Thousand pounds	*Thousand pounds*
Packaged:		
Groundfish and ocean perch fillets	93,548	92,643
Fish sticks	72,217	69,824
Fish portions	78,678	59,847
Canned:		
Tuna	335,506	310,612
Salmon	182,435	177,443
Sardines:		
Maine	50,248	17,635
Pacific	6,168	18,859
Mackerel, jack and Pacific	54,900	62,026
Shrimp, Gulf States	13,249	9,284
Industrial products:		
Fish meal	622,464	622,530
Fish oil	255,854	258,120
Fish solubles and homogenized condensed fish	248,668	224,508

A–3.—*Foreign trade in fishery products, by quantity and value, calendar years 1962 and 1961*

Item	1962		1961	
	Quantity	Value	Quantity	Value
	Thousand pounds	*Thousand dollars*	*Thousand pounds*	*Thousand dollars*
Imports:				
Edible:				
Fresh or frozen:				
Fresh-water (not fillets)	41,000	13,938	41,070	14,253
Salt-water (not fillets)	413,050	68,707	310,877	49,874
Groundfish and ocean perch fillets	221,420	46,937	195,099	42,595
Other fillets	76,443	26,127	67,167	23,593
Shrimp	141,183	91,898	126,268	68,538
Lobsters:				
Common	22,101	15,000	21,299	14,571
Spiny	35,947	42,182	32,610	34,468
Other shellfish	18,454	8,668	16,715	5,949
Canned:				
Salmon	6,843	3,436	7,167	3,545
Sardines	52,945	16,291	42,488	12,543
Tuna	56,719	22,884	58,663	22,175
Crabmeat	3,505	4,701	4,237	5,780
Other	53,287	24,688	53,813	22,309
Cured, dried, pickled, or salted	73,997	13,742	77,480	13,703
Smoked or kippered	4,132	1,032	4,626	1,137
Other	1,810	651	2,083	724
Total edible	1,222,836	400,882	1,061,662	335,757
Nonedible:				
Fish and marine animal oils	[1] 11,257	8,730	[1] 10,102	8,475
Fish meal and scrap	[2] 252	24,298	[2] 218	16,740
Other		41,338		36,086
Total nonedible		74,366		61,301
Grand total, imports		475,248		397,058
Exports:				
Edible:				
Fresh or frozen	20,822	6,373	11,558	6,348
Canned:				
Mackerel	4,272	671	3,908	581
Salmon	8,978	7,292	7,186	5,580
Sardines	7,766	1,503	7,660	1,397
Other	13,020	5,501	8,296	4,573
Total canned	34,036	14,967	27,050	12,131
Cured	1,022	718	976	756
Other	650	412	553	359
Total edible	56,530	22,470	40,137	19,594
Nonedible:				
Fish and marine animal oil	123,050	6,047	122,486	8,908
Other		7,211		6,208
Total nonedible		13,258		15,116
Grand total, exports		35,728		34,710

[1] In thousand gallons.
[2] In thousand tons.

Appendix B—New Legislation

Propagation of Disease-Resistant Strains of Oysters

16 U.S.C. 760j–7601

Promotes the production of oysters by propagation of disease-resistant strains; authorizes a sum not to exceed $100,000 for grants of five States presently involved in rehabilitating oyster beds in Delaware Bay for research and related activities necessary in developing and propagating disease-resistant strains of oysters.

76 Stat. 356; Public Law 87–580; Act of August 9, 1962.

Transfer of U.S. Vessel *Alaska* to California

Not codified

Authorizes and directs the Secretary of the Interior to donate and convey to the State of California for the use and benefit of the department of fish and game of the State, all right, title, and interest of the United States in and to the fishing vessel M/V *Alaska*.

76 Stat. 317; Public Law 87–576; Act of August 9, 1962.

Fishermen's Estimated Income Tax Declaration

26 U.S.C. 6015, 6073, 6153, 6654

Amends the Internal Revenue Code of 1954 to give to fishermen the same right as farmers in filing and payment of estimated income tax.

76 Stat. 575; Public Law 87–682; Act of September 25, 1962.

Food and Agriculture Act of 1962, Section 343

7 U.S.C. 1991

Provides, "As used in this title (1) the term 'farmers' shall be deemed to include persons who are engaged in, or who, with assistance afforded under this title, intend to engage in, fish farming, and (2) the term 'farming' shall be deemed to include fish farming." Provides for operating emergency loans for fish farmers under Federal Agricultural Credit Regulations.

76 Stat. 632; Public Law 87–703; Act of September 27, 1962.

Amendment of the Pacific Marine Fisheries Compact

The addition of article XII to the Pacific Marine Fisheries Compact permits the participation of the States of Alaska, Hawaii, and Idaho in the compact.

61 Stat. 419; Public Law 232, 80th Cong.; Act of July 24, 1947.
76 Stat. 763; Public Law 87–766; Act of October 9, 1962.

National Fisheries Center and Aquarium

16 U.S.C. 1051–1058

Authorizes the construction of a National Fisheries Center and Aquarium in the District of Columbia and provides for its operation under the Secretary of the Interior.

76 Sat. 752; Public Law 87–758; Act of October 9, 1962.

Act of October 10, 1962

Congress consents to a compact entered into between the State of Maryland and the Commonwealth of Virginia for the creation of the Potomac River Compact of 1958. Gives Maryland and Virginia permission to set up a Potomac River Fisheries Commission, which will regulate through three members from each State the taking of fish and shellfish from the Potomac River between the District of Columbia line and Chesapeake Bay. Research, regulation of fisheries, an oyster inspection fee, and licensing would be within the power of the new commission.

76 Stat. 797; Public Law 87–783; Act of October 10, 1962.

Act of October 15, 1962

7 U.S.C. 1961

Extends to oyster planters the benefits of the provisions of the present law which provide for production disaster loans for farmers and stockmen.

76 Stat. 958; Public Law 87–832; Act of October 15, 1962.

Amendment to the Tuna Conventions Act of 1950

16 U.S.C. 951–961

Amends the Act of September 7, 1950, by extending the regulatory authority of the Federal and State agencies concerned under the terms of the Convention for the Establishment of an Inter-American Tropical Tuna Commission, signed at Washington, May 31, 1949; provides for the issuance and enforcement of Federal regulations to carry out recommendations of the Commission for the conservation of tuna (especially yellowfin) resources in the eastern Pacific.

64 Stat. 777; Public Law 764, 81st Cong.; Act of September 7, 1950.
76 Stat. 923; Public Law 87–814; Act of October 15, 1962.

Appendix C—Fisheries Loan Fund

C–1.—*Status of fisheries loan fund, June 30, 1962*

Funds appropriated		$13,000,000
Principal collected	$4,840,000	
Interest collected and accrued	1,134,000	
Total collected		5,974,000
Total		18,974,000
All expenses to end of fiscal year 1961	902,784	
Limit on expenses fiscal year 1962	250,000	
Loans approved	12,785,156	
Total		13,937,940
Balance		5,036,060

C–2.—*Cumulative totals, fiscal years 1961 and 1962, and totals, fiscal year 1962*

	Cumulative total				Total fiscal year 1962	
	As of June 30, 1961		As of June 30, 1962			
	Number	*Amount*	*Number*	*Amount*	*Number*	*Amount*
Applications received	961	$28,949,169	1,169	$33,008,423	208	$4,059,254
Applications approved	511	12,013,809	618	14,646,311	107	2,632,502
Applications declined	246	6,625,603	309	7,960,558	63	1,334,955
Applications ineligible	82	1,980,879	96	2,638,804	14	657,925
Being processed	32	1,961,455	23	407,011		

C–3.—*Cumulative totals by area, fiscal years 1961 and 1962, and totals, fiscal year 1962*

	Cumulative total				Total fiscal year 1962	
	As of June 30, 1961		As of June 30, 1962			
	Number	*Amount*	*Number*	*Amount*	*Number*	*Amount*
Northeast:						
Applications received	262	$9,073,666	292	$9,603,141	30	$529,475
Applications approved	140	4,080,774	153	4,320,824	13	240,050
California:						
Applications received	145	9,306,083	175	10,320,850	30	1,014,767
Applications approved	82	3,828,573	104	4,684,481	22	855,908
Gulf:						
Applications received	223	5,932,983	299	7,547,516	77	1,614,533
Applications approved	82	1,980,288	114	2,604,804	32	624,516
Pacific Northwest:						
Applications received	166	3,101,506	204	3,626,821	38	525,315
Applications approved	104	1,440,912	126	2,058,080	22	617,168
Alaska:						
Applications received	119	887,498	146	1,183,008	27	295,502
Applications approved	83	527,136	97	718,834	14	191,698
Great Lakes:						
Applications received	28	332,025	32	369,525	4	37,500
Applications approved	8	58,420	9	60,420	1	2,000
Hawaii:						
Applications received	17	313,408	20	355,570	3	42,162
Applications approved	11	95,906	14	197,068	3	101,162
Puerto Rico:						
Applications received	1	2,000	1	2,000	0	0
Applications approved	1	1,800	1	1,800	0	0

C–4.—*Authorized use of loan proceeds, percentage by area*

(From beginning of program through fiscal year 1962)

	Debt Payment	Improvements	Other
New England and Middle Atlantic	52	46	2
South Atlantic and Gulf	67	31	2
California	31	65	4
Pacific Northwest	37	62	1
Great Lakes	13	87	0
Alaska	38	61	1
Hawaii and Puerto Rico	44	52	4
Total	45	53	2

C–5.—*Number of loan applications received monthly, fiscal years 1957–62*

	1957	1958	1959	1960	1961	1962
July		17	9	15	8	19
August		17	12	13	10	16
September		14	10	9	7	16
October		12	7	16	6	14
November		18	13	9	19	26
December	88	11	13	15	21	14
January	16	14	10	16	18	29
February	41	18	12	27	26	19
March	40	22	15	28	13	19
April	22	22	14	13	18	16
May	28	11	10	19	31	9
June	30	9	12	10	7	11
Total	265	185	137	190	184	208

C–6.—*Amounts applied for monthly, fiscal years 1957–62*

	1957	1958	1959	1960	1961	1962
July		$274, 524	$251, 571	$830, 182	$134, 196	$532, 305
August		931, 110	363, 000	234, 465	275, 972	297, 614
September		607, 851	385, 517	465, 610	176, 781	438, 773
October		204, 635	62, 532	305, 150	195, 095	145, 443
November		375, 583	153, 559	124, 905	428, 011	296, 877
December	$2, 533, 020	160, 670	331, 502	198, 161	425, 076	182, 876
January	377, 485	520, 323	153, 501	344, 197	203, 752	907, 519
February	1, 458, 748	305, 318	115, 000	554, 425	665, 798	195, 612
March	2, 563, 703	862, 325	185, 069	698, 063	692, 766	390, 959
April	629, 131	336, 888	189, 871	226, 542	426, 453	321, 438
May	2, 276, 774	642, 025	185, 869	1, 003, 874	877, 990	86, 911
June	948, 437	224, 652	291, 980	343, 372	216, 160	262, 927
Total	10, 787, 298	5, 445, 904	2, 668, 971	5, 328, 946	4, 718, 050	4, 059, 254

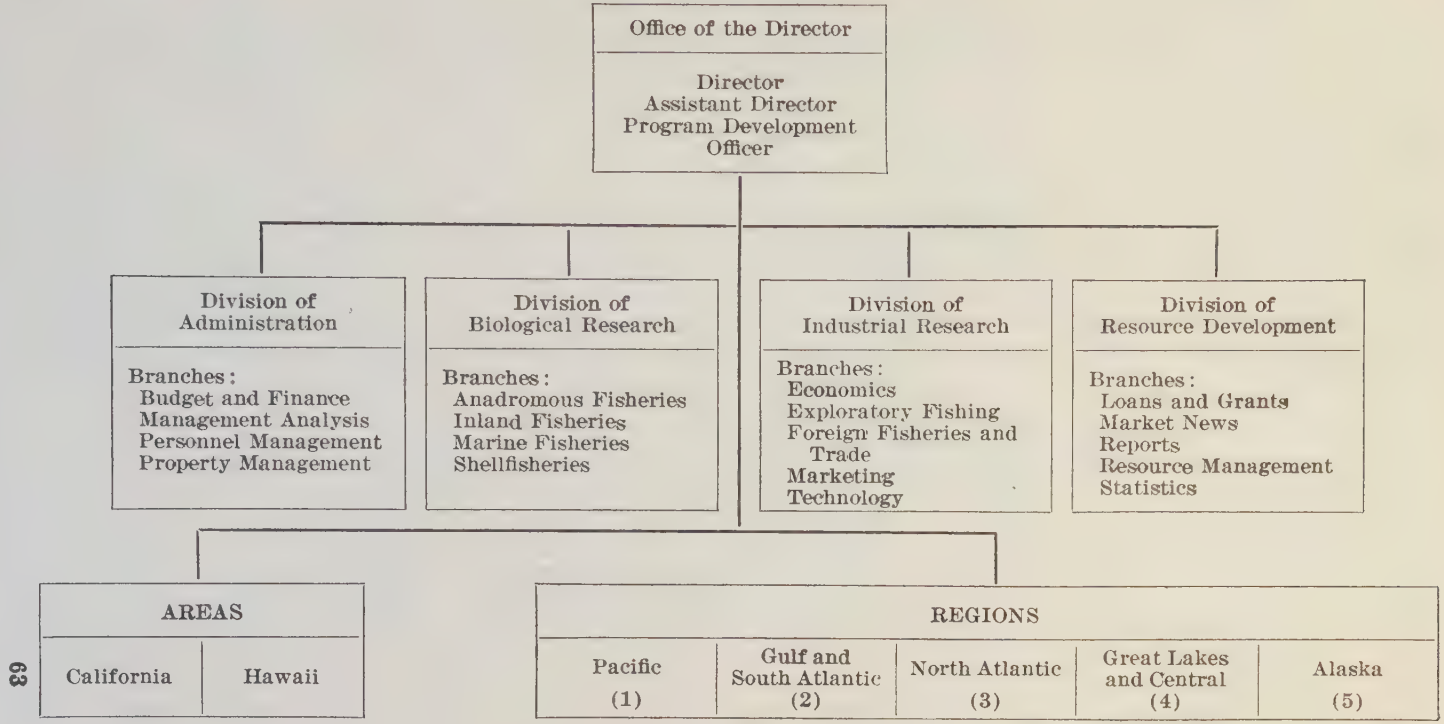
Appendix D—Organizations With Which the Bureau Had Contracts in 1962

Organization	*Location*
A.C.I. Productions	New York, N.Y.
Alaska Department of Education	Juneau, Alaska
Alaska Department of Fish and Game	Juneau, Alaska
Barkley and Dexter Laboratories, Inc	Fitchburg, Mass.
Boston College	Boston, Mass.
Bowdoin College	Brunswick, Maine
California Department of Fish and Game	Sacramento, Calif.
California, University of	Davis, Calif.
California, University of	San Diego, Calif.
Connecticut, University of	Storrs, Conn.
Delaware, University of	Newark, Del.
Duke University	Durham, N.C.
F. Mansfield and Sons Company	New Haven, Conn.
Florida State Board of Conservation	Tallahassee, Fla.
Florida, University of	Gainesville, Fla.
Great Lakes Fishery Commission	Ann Arbor, Mich.
Harvard University	Cambridge, Mass.
Hawaii, University of	Honolulu, Hawaii
Idaho Department of Fish and Game	Boise, Idaho
Johns Hopkins University	Baltimore, Md.
Louisiana Wild Life and Fisheries Commission	New Orleans, La.
Mayo Association	Rochester, Minn.
Maine Department of Sea and Shore Fisheries	Augusta, Maine
Maryland Department of Tidewater Fisheries and National Resources Institute.	Annapolis, Md.
Maryland, University of	College Park, Md.
Massachusetts Institute of Technology	Cambridge, Mass.
Miami, University of	Miami, Fla.
Michigan, University of	Ann Arbor, Mich.
Minnesota, University of	Minneapolis, Minn.
Minnesota, University of (Hormel Institute)	Austin, Minn.
National Fisheries Institute	Washington, D.C.
New Hampshire, University of	Durham, N.H.
North Carolina, University of	Chapel Hill, N.C.
Oregon Fish Commission	Portland, Oreg.
Oregon State Game Commission	Portland, Oreg.
Oregon State University	Corvallis, Oreg.
Pennsylvania State University	University Park, Pa.
Pennsylvania, University of	Philadelphia, Pa.
Reed Research, Inc.	Washington, D.C.
Refrigeration Research Foundation	Colorado Springs, Colo.
Rhode Island, University of	Kingston, R.I.
Rutgers University	New Brunswick, N.J.
Scripps Institution of Oceanography	La Jolla, Calif.
Texas, A. & M. College of	College Station, Tex.

717-167—64——5

Organization	*Location*
United States Testing Company	Hoboken, N.J.
Washington, State Department of Fisheries	Seattle, Wash.
Washington, State Department of Game	Olympia, Wash.
Washington, University of	Seattle, Wash.
Washington, University of (Department of Economics).	Seattle, Wash.
Washington, University of (Fisheries Research Institute).	Seattle, Wash.
Woods Hole Oceanographic Institute	Woods Hole, Mass.
Yale University	New Haven, Conn.

Appendix E—Organization Chart



Appendix F—Budget for Fiscal Year 1962

Function	Appropriations								Contributed funds [2]	Reimbursements [3]	Total
	Management and investigations of resources	Special foreign currency program	Construction	Construction of fishing vessels	General administrative expenses	Administration of Pribilof Islands	Payment to Alaska from Pribilof Islands receipts	Promote and develop fisheries [1]			
Management	$369,000									$15,684	$384,684
Marketing and technology	2,672,000	$125,000						$1,798,700	$402,552	324,154	5,322,406
Research	6,619,000	175,000						2,578,900	685,026	593,537	10,651,463
Research on fish migration over dams	924,000							252,700		89,284	1,265,984
Fishing vessel mortgage insurance	51,000										51,000
Columbia River fishery facilities	1,915,000		$1,431,000							671	3,346,671
Construction of fishery facilities			6,130,000								6,130,000
Construction of fishing vessels				$750,000							750,000
General administrative services					$482,000			367,000	35,000	23,223	907,223
Administration of Pribilof Islands						$1,748,000				15,790	1,763,790
Fur seal research						233,000					233,000
Payment to Alaska from Pribilof Islands receipts							$536,809				536,809
Fisheries Advisory Committee								20,000			20,000
Total	12,550,000	300,000	7,561,000	750,000	482,000	1,981,000	536,809	5,017,300	1,122,578	1,062,343	31,363,030

[1] Funds made available under Public Law 466, 83d Cong. (known as the Saltonstall-Kennedy Act of 1954).
[2] Includes $707,686 from Great Lakes Fishery Commission and $402,552 for inspection and grading of fishery products from members of the fishing industry.
[3] Includes $291,500 from Atomic Energy Commission; $261,000 from Sport Fisheries and Wildlife, and $235,000 from Corps of Engineers.

Appendix G—Physical Properties

G–1.—*Principal laboratories and installations, calendar year 1962*

Location	Type	Principal use	Gross valuation [1]
Alaska:			
Auke Bay	Biological Laboratory	Biological research	$405,647
Juneau	Exploratory Fishing and Gear Research Base, warehouse and shops.	Exploratory fishing and gear research, vessel maintenance, loans and grants.	[2] 436,000
Ketchikan	Technological Laboratory	Technological research	195,000
Pribilof Islands	Fur seal processing facilities and native villages.	Management of Alaska fur seals.	2,912,000
California:			
La Jolla	Biological Laboratory	Biological research	[3]
San Diego	do	do	[3]
Stanford	do	do	[3]
Connecticut, Milford	do	do	91,000
District of Columbia:			
Navy Yard Annex	do	do	[3]
U.S. National Museum	Ichthyological Laboratory	do	[3]
Florida:			
Gulf Breeze	Biological Laboratory	do	63,000
St. Petersburg Beach	Office of Loans and Grants	Loans and grants	[3]
Georgia, Brunswick	Biological Laboratory	Biological research	[3]
Hawaii, Honolulu	do	Biological research, loans and grants, statistics.	314,000
Maine, Boothbay Harbor	do	Biological research	[2] 140,000
Maryland:			
College Park	Technological Laboratory	Technological research, home economics.	83,000
Oxford	Biological Laboratory	Biological research, statistics.	179,000
Massachusetts:			
Boston	Office of Loans & Grants	Loans and grants	[3]
Gloucester	Technological Laboratory	Technological research, fishery products inspection.	320,000
Do	Exploratory Fishing and Gear Research Base.	Exploratory fishing and gear research.	55,000
Woods Hole	Biological Laboratory	Biological research	1,029,000
Michigan, Ann Arbor	Biological Laboratory, Technological Station, Exploratory Fishing and Gear Research Station.	Biological and technological research, exploratory fishing and gear research, marketing development, statistics.	[3]
Mississippi, Pascagoula	Exploratory Fishing and Gear Research Base, Technological Laboratory.	Exploratory fishing and gear research, market development, biological and technological research.	86,000
North Carolina, Beaufort	Biological Laboratory	Biological research, statistics.	201,000
Texas, Galveston	do	Biological research	295,000
Washington, Seattle	Biological Laboratories (3), Technological Laboratory, Exploratory Fishing and Gear Research Base, dock and warehouse.	Biological and technological research, exploratory fishing and gear research, Pribilof Islands supply, fishery products inspection.	[2] 142,000
Puerto Rico, Mayaguez	Technological Laboratory	On loan to University of Puerto Rico.	27,000

[1] Figures shown are original acquisition or construction costs.
[2] Installations at this location are both owned and leased by Bureau of Commercial Fisheries.
[3] Installation not owned by Bureau of Commercial Fisheries. Includes property held under leases, cooperative agreements, and use permits.

G–2.—*Minor field research stations, market news offices, exploratory fishing stations, market development offices, and statistical offices, calendar year 1962*

Location	Type	Principal use	Gross valuation [1]
Alabama, Bayou LaBatre	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Alaska:			
Brooks Lake	Field Research Station	Biological research	$21,000
Juneau	Statistical Field Office	Statistics	(3)
Karluk Lake	Field Research Station	Biological research	27,000
Kasitsna Bay	do	do	12,000
Little Port Walter	do	do	158,000
Olsen Bay	do	do	7,000
St. Paul Island	do	do	
Traitors Cove	do	do	8,000
Arkansas, Dumas	Marketing Office	Marketing	(2)
California:			
Mill Creek	Field Research Station	Biological research	29,000
San Pedro	Market News and Statistics Office.	Market news and statistics reporting.	(2)
San Francisco	Marketing Office	Marketing	(2)
Terminal Island	Marketing Office and Technological Station.	Technological research, fishery products inspection.	(2)
Tiburon	Field Research Station	Biological research	(2)
Florida:			
Apalachicola	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Fort Myers	do	do	(2)
Green Cove Springs	Field Research Station	Biological research	(2)
Key West	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Miami	Statistical Field Office	Statistics and biological research.	(2)
Panama City	Exploratory Fishing and Gear Research Station.	Exploratory fishing and gear research.	(2)
St. Petersburg Beach	Field Research Station and Fishery Products Inspection Office.	Biological research, fishery products inspection, marketing.	
Tampa	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Georgia:			
Atlanta	Marketing Office	Marketing	(2)
Brunswick	Statistical Field Office, Exploratory Fishing and Gear Research Station.	Statistics, exploratory fishing and gear research.	(2)
Idaho, Weiser	Field Research Station	Biological research	(2)
Illinois:			
Chicago	Market News Office, Fishery Products Inspection Office.	Market news reporting, fishery products inspection.	(2)
Do	Marketing Office	Marketing	(2)
Louisiana:			
Empire	Statistical Field Office	Statistics	(2)
Houma	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Morgan City	do	do	(2)
New Orleans	Market News Office, Statistical Field Office.	do	(2)
Port Sulphur	Statistical Field Office	Statistics	(2)
Maine:			
Portland	Field Office	Statistics, market news, biological research.	(2)
Rockland	do	do	(2)
West Boothbay Harbor	Statistical Field Office	Statistics	(2)
Maryland:			
Baltimore	Market News Office, Marketing.	Market news reporting, marketing.	(2)
Salisbury	Statistical Field Office	Statistics	(2)
Massachusetts:			
Boston	Market News Office, Marketing.	Market news reporting, statistics, biological and technological research, marketing.	(2)
Gloucester	Field Offices	Statistics, biological research, market news, fishery products inspection.	
New Bedford	Field Office	Statistics, biological research, market news reporting.	(2)
Provincetown	Statistical Field Office	Statistics, market news reporting.	(2)

See footnotes at end of table.

G–2.—*Minor field research stations, etc.*—Continued

Location	Type	Principal use	Gross valuation [1]
Michigan:			
Hammond Bay	Field Research Station	Biological research	(2)
Ludington	do	do	(2)
Marquette	do	do	(2)
Northville	do	do	
Mississippi:			
Ocean Springs	Statistical Field Office	Statistics and market news reporting.	(3)
Pascagoula	Field Research Station	Biological research, marketing.	(3)
Missouri, St. Louis	Marketing Office	Marketing	(3)
New Jersey, Toms River	Statistical Field Office	Statistics	(3)
New York:			
Bayport	do	do	(2)
New York City	Market News Office, Marketing, Fishery Products Inspection Office.	Market news reporting, marketing, fishery products inspection.	(3)
Ohio:			
Cleveland	Marketing Office	Marketing	(3)
Sandusky	Field Research Station	Biological research	(2)
Oregon, Portland	do	do	(3)
Rhode Island:			
Point Judith	Field Station	Statistics, biological research.	(3)
Warren	Statistical Field Office	Statistics	(3)
South Carolina, Charleston	do	do	(3)
Texas:			
Aransas Pass	Market News and Statistical Field Office.	Statistics and market news.	(2)
Brownsville	Market News and Statistical Field Office, Fishery Products Inspection Office.	Statistics and market news, fishery products inspection.	(3)
Dallas	Marketing Office	Marketing	(3)
Freeport	Statistical Field Office	Statistics	(3)
Galveston	Market News and Statistical Field Office.	Statistics and market news.	(2)
Port Arthur	do	do	(3)
Port Isabel	do	do	(2)
Virginia:			
Franklin City	Field Research Station	Biological research	(3)
Hampton	Market News Office	Market news reporting	(3)
Portsmouth	Statistical Field Office	Statistics	(3)
Weems	do	do	(3)
Washington:			
North Bonneville	Field Research Station	Biological research	(3)
Seattle	Market News and Statistical Office.	Market news reporting, statistics, loans and grants.	(3)
Do	Marketing Office	Marketing	(3)
Wisconsin:			
Ashland	Field Research Station	Biological research	(3)
La Crosse	Statistical Field Office	Statistics	(3)

[1] Figures shown are original acquisition or construction costs.
[2] Installation not owned by Bureau of Commercial Fisheries. Includes property held under leases, cooperative agreements, and use permits.
[3] Installations at this location are both owned and leased by Bureau of Commercial Fisheries.

G–3.—*Bureau of Commercial Fisheries vessel fleet, calendar year 1962*

Name of vessel	Home port	Length (feet)	Year built	Cost	Horsepower	Mission
Albatross IV	Woods Hole, Mass.	187	1962	2,000,000	1,100	Fishery and biological research studies; oceanographic studies in Atlantic waters.
Geo B. Kelez	Seattle, Wash.	176	1944	805,000	1,000	High-seas salmon investigation and oceanography.
Black Douglas	San Diego, Calif.	152	1926	75,000	325	Biology, distribution, spawning of the Pacific sardine; abundance and life history studies of other commercial species.
Penguin II	Seattle, Wash.	148	1943	533,532	875	Transportation of supplies and personnel to the Pribilof Islands fur seal stations.

G–3.—*Bureau of Commercial Fisheries vessel fleet, calendar year 1962*—Con.

Name of vessel	Home port	Length (feet)	Year built	Cost	Horsepower	Mission
Delaware	Gloucester, Mass.	147	1937	302,473	735	Exploratory fishing and biological studies on the ground fishes and sea scallops; gear research.
Geronimo	Washington, D.C.	147	1944	----------	2,000	Fishery oceanographic research.
Hugh M. Smith	Terminal Island, Calif.	128	1945	150,000	500	Pacific oceanography (since 1959 on loan to University of California Scripps Institution of Oceanography).
Charles H. Gilbert	Honolulu, Hawaii	123	1952	409,890	640	Pacific oceanography; tuna biology, behavior and distribution.
Oregon	Pascagoula, Miss.	100	1950	300,000	600	Exploratory fishing for shrimp, tuna, and other potentially commercial species; gear research.
Alaska	California	100	(1)	300,000	600	On loan to the California Department of Fish and Game.
John N. Cobb	Seattle, Wash.	93	1950	235,392	500	Exploratory fishing for pelagic and bottom fish, shrimp and crabs; gear research.
Murre II	Juneau, Alaska	86	1943	64,000	115	Oceanographic studies in coastal waters of southeastern Alaska with limited use for servicing shore facilities.
Joseph R. Manning.	do	86	1950	181,600	320	Bottom surveys for halibut; patrol work; observations on foreign fishing activities in Bering Sea.
Pelican	do	75	1930	50,200	200	On loan to the Washington Department of Fish and Game.
Geo. M. Bowers	Panama City, Fla.	73	1956	93,800	210	Primarily gear research.
Kaho	Saugatuck, Mich.	65	1961	85,000	--------	Exploratory fishing and gear-research on industrial fishes, chubs, alewives sheepshead, gizzard shad and smelt.
Rorqual	Gloucester, Mass.	64	1941	187,000	230	Gear research and inshore exploration on herring and shellfish.
T–19	South Carolina	64	1942	187,000	--------	On loan to State of South Carolina.
Cisco	Saugatuck, Mich.	60	1950	85,000	175	Research on deepwater fish species, their distribution, abundance, and ecology; limnology.
Heron	Juneau, Alaska	58	1940	19,000	135	Salmon and herring research.
Musky II	Sandusky, Ohio	53	1931	3,666	170	Studies on warm-water fishes of Lake Erie; limnology: pollution studies.
Siscowet	Ashland, Wisc.	52	1946	81,000	170	Research on deepwater fish species, their distribution, abundance, and ecology; limnology.
Shang Wheeler	Milford, Conn.	50	1951	45,840	140	Shellfish research; oyster and clam propagation; predator control.
Alosa	Oxford, Md.	48	1941	6,500	82	Shell fish research; oyster propagation and disease studies.
Kingfish	St. Petersburg Beach, Fla.	43	1954	24,500	150	Estuarine investigations.
J–3486	North Carolina	43	1942	28,000	--------	On loan to State of North Carolina.
Phalarope II	Boothbay Harbor, Maine.	40	1932	8,000	225	Clam and herring studies.
Sockeye	King Salmon, Alaska.	40	1946	11,250	175	Salmon research work.
J–1110	Beaufort, N.C.	40	1934	15,000	200	Research on shellfish, striped bass, and other coastal species; collection of samples for radiobiological studies.

[1] Year vessel was built is unknown.

Appendix H—Fish and Wildlife Service Series and a 1962 List of Publications by Bureau Personnel

The regular, established series of the Fish and Wildlife Service in which Bureau of Commercial Fisheries publications appear are:

Fishery Bulletin.—Technical reports on scientific investigations of fishery biology. The Bulletin of the United States Fish Commission was begun in 1881; it became the Bulletin of the Bureau of Fisheries in 1904 and the Fishery Bulletin of the Fish and Wildlife Service in 1941. Through volume 46, separates were issued as Documents. (The last Document was No. 1103.) Beginning with volume 47 in 1931, each separate was issued as a numbered Bulletin. Fishery Bulletins 192 through 214 (705 p.) of volumes 61 and 62 were issued in 1962. Bulletins are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402; they are distributed free to libraries and to a limited number of scientific cooperators.

Fishery Industrial Research.—Technical reports dealing with scientific investigations of fishery technology, economics, exploratory fishing, and gear research. Volume 2, no. 1 (58 p.) was published in 1962. They are distributed free to libraries and to a limited number of scientific cooperators.

Special Scientific Report—Fisheries.—Preliminary or progress reports and reports on scientific investigations of restricted scope. Established as Special Scientific Reports in 1940, Nos. 1 to 67 were issued from that date to 1949, when the new series, Special Scientific Report—Fisheries, with new serial numbering, was started. In 1962 there were 24 (888 p.) of these reports published, No. 436 being the last. They are processed from typewritten text to speed publication and are distributed free to libraries and cooperators on a limited mailing list.

North American Fauna.—This series (begun by the Bureau of Biological Survey in 1889) comprises technical reports of fundamental scientific investigations, of primary interest to naturalists and researchers, relating to the biology of mammals, birds, reptiles, and amphibians. These reports include monographs and reports of regional biological surveys; studies of distribution, migration, life history, and ecology; contributions to the theory and methodology of research and papers on the scientific basis of natural resource management. One number (212 p.) on fur seals was issued in 1962. This series is distributed to depository libraries. The Fish and Wildlife Service distributes copies without charge to official agencies. libraries, and researchers in fields related to the Service's work. Additional copies may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402.

Fishery Leaflet.—Popular information on fishery subjects intended primarily for use in correspondence. Twenty leaflets (794 p.) were published during the year. They are distributed free on request.

Circular.—Popular and semitechnical publications of general and regional interest intended to aid conservation and management. Eight circulars (372 p.) were published in 1962. They are usually distributed to depository libraries.

Commercial Fisheries Abstracts.—A monthly abstract of world literature (chiefly English language) on fishery technology. Volume 15 in 1962 had 12 issues (360 p.). They have free, but limited distribution.

Commercial Fisheries Review.—A monthly presentation of developments and news of domestic and foreign fishery industries and trends. Volume 24 in 1962 had 12 issues (1,402 p.). For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Subscription price $5.50 a year; $2 additional for foreign mailing; single copies 60 cents each.

Statistical Digest.—Annual statistics with detailed tabulations relating to fishery production, manufacture, and commerce. These succeeded the Administrative Report series. One digest (531 p.) was published in 1962. Digests are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402; some are distributed free to a limited mailing list.

Current Fishery Statistics.—Current statistical information on fishery production, manufacture, and domestic or foreign trade; issued monthly, quarterly, or annually, by States, regions or larger units. In 1962 there were 242 monthly landings reports (822 p.) for 20 States; 28 monthly reports of manufactured products (129 p.); and 38 annual reports of sectional and State operating units, catch statistics, manufactured products, and foreign trade (412 p.)

Fishery Products Report.—Daily (5 times a week), monthly, and annual data on landings, receipts, supplies, prices, imports, and movements of fish and fish products in local areas; market conditions; and fishery developments in the United States and foreign countries. Also special Market News data reports are issued sporadically. Seven Market News Service field offices prepare and mail these free reports. During 1962 the daily reports totaled 6,282 pages; the monthly and annual, 1,669 pages; and supplementary, 101 pages.

Miscellaneous papers.—Eighteen miscellaneous papers, totaling 538 pages, were issued.

A detailed list of publications of the Bureau of Commercial Fisheries and its personnel or contractors during 1962 follows. The articles are listed by authors.

Publications[1]

AHLSTROM, ELBERT H.

Fluctuations and fishing. Proceedings of the World Scientific Meeting on the Biology of Sardines and Related Species, vol. 3, p. 1353–1371. Food and Agriculture Organization of the United Nations, Rome, Italy. [Published in 1960 but not distributed until 1962.]

Review of *Fauna e Flora del Golfo di Napoli. Mongrafia 38: Uova, Larve e Stadi Giovanili di Teleostei.* Copeia, 1962, no. 4, p. 858–860.

Synopsis on the biology of the Pacific sardine (*Sardinops caerulea*). Proceedings of the World Scientific Meeting on the Biology of Sardines and Related Species, vol. 2, p. 415–451. Food and Agriculture Organization of the United Nations, Rome, Italy. [Published in 1960 but not distributed until 1962.]

AHLSTROM, ELBERT H., and JAMES R. THRAILKILL.

Plankton volume loss with time of preservation. [Abstract.] Conseil Permanent International pour l'Exploration de la Mer, Rapports et Procès-Verbaux des Réunions, vol. 153, p. 78.

[1] This list does not include Commercial Fisheries Abstracts, Current Fishery Statistics, and Commercial Fisheries Review, except a few articles for which the authors' names are given.

ALBANO, G. A.

Chicago receipts of fresh and frozen fishery products, and wholesale market trends, 1961. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 24, no. 7, p. 1–8. [Also as Separate No. 652.]

Receipts and prices of fresh and frozen fishery products at Chicago, 1961. U.S. Fish and Wildlife Service, Bureau of Commerical Fisheries, Chicago Market News Service, 70 p.

ALDRICH, DAVID K.

Photoautotrophy in *Gymnodinium breve* Davis. Science, vol. 137, no. 3534, p. 988–990.

ALLEN, DONALD M., and T. J. COSTELLO.

Grading large numbers of live shrimp for marking experiments. U.S. Fish and Wildlife Service, Progressive Fish-Culturist, vol. 24, no. 1, p. 46–48.

ALVERSON, DAYTON L.

Ocean temperatures and their relationship to albacore tuna (*Thunnus germo*) distribution in waters off the coast of the States of Oregon and Washington, and the Province of British Columbia. [Abstract.] *In* John C. Marr (editor), Pacific Tuna Biology Conference, August 14–19, 1961, Honolulu, Hawaii, p. 20. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 415.

ANDERSON, A. W.

Federal assistance in the marketing of fishery products in the United States. Indo-Pacific Fisheries Council, Proceedings, 9th Session, Karachi, Pakistan, 6–23 January, 1961, sec. III, p. 95–104.

ANDERSON, GAYLORD A.

Three portable feeders for metering chemical into streams for control of sea lamprey. U.S. Fish and Wildlife Service, Progressive Fish-Culturist, vol. 24, no. 4, p. 190–192.

ANDERSON, WILLIAM W.

Recognizing important shrimps of the South. U.S. Fish and Wildlife Service, Fishery Leaflet 536, 6 p.

Research at the U.S. Bureau of Commercial Fisheries Biological Laboratory, Brunswick, Georgia. *In* D. S. Gorsline (editor), Proceedings of the First National Coastal and Shallow Water Research Conference, October 1961, Baltimore, Md.; Los Angeles, Calif.; Tallahassee, Fla. p. 246–247.

Studies in progress by the U.S. Bureau of Commercial Fisheries Biological Laboratory, Brunswick, Georgia. [Baltimore abstracts.] *In* D. S. Gorsline (editor), Proceedings of the First National Coastal and Shallow Water Research Conference, October 1961, Baltimore, Md.; Los Angeles, Calif.; Tallahassee, Fla., p. 15.

APPLEGATE, VERNON C., and EVERETT L. KING, JR.

Comparative toxicity of 3-trifluormethyl-4-nitrophenol (TFM) to larval lampreys and eleven species of fishes. Transactions of the American Fisheries Society, vol. 91, no. 4, p. 342–345.

AUSTIN, THOMAS S., and RICHARD A. BARKLEY.

Use of oceanographic monitoring stations in fishery research. [Abstract.] *In* John C. Marr (editor), Pacific Tuna Biology Conference, August 14–19, 1961, Honolulu, Hawaii, p. 20. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 415.

BAPTIST, JOHN P., and THOMAS J. PRICE.
Accumulation and retention of cesium[137] by marine fishes. U.S. Fish and Wildlife Service, Fishery Bulletin 206, vol. 62, iv+p. 177–187.

BECKER, CLARENCE DALE.
Estimating red salmon escapements by sample counts from observation towers. U.S. Fish and Wildlife Service, Fishery Bulletin 192, vol. 61, iv+p. 355–369.

BEETON, ALFRED M.
Light penetration in the Great Lakes. Proceedings, Fifth Conference on Great Lakes Research, April 9–10, 1962. University of Michigan, Institute of Science and Technology, Great Lakes Research Division, Publication No. 9, p. 68–76.

BERRY, FREDERICK H., and LUIS R. RIVAS.
Data on six species of needlefishes (Belonidae) from the Western Atlantic. Copeia, 1962, no. 1, p. 152–160.

BETHEA, SAMMIE, and MARY E. AMBROSE.
Comparison of pH, trimethylamine content, and picric acid turbidity as indices of iced shrimp quality. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 24, no. 3, p. 7–10. [Also as Separate No. 643.]

BIRD, H. R., F. H. STEINKE, and T. D. RUNNELS.
The unidentified growth factor activity and supplemental feeding value of commercial fish meals of known processing history. Poultry Science, vol. 41, no. 6, p. 1740–1744.

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An oceanographic study of the Gulf of Tehuantepec. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 404, iii+28 p.

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Tuna oceanography in the eastern tropical Pacific. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 400, iii+48 p.

BLACKBURN, MAURICE, RAYMOND C. GRIFFITHS, ROBERT W. HOLMES, and WILLIAM H. THOMAS.
Physical, chemical, and biological observations in the eastern tropical Pacific Ocean: Three cruises to the Gulf of Tehuantepec, 1958–59. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 420, ii+170 p.

BOYAR, H. C.
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BOYAR, H. C., and J. J. GRAHAM.
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BROCK, VERNON E.
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Operational aspects of oceanographic instrumentation. Part III. For the Bureau of Commerical Fisheries (Biological). *In* Julius Rockwell, Jr. (editor), Proceedings of the Government-Industry Oceanographic Instrumentation Symposium, August 16–17, 1961, Washington, D.C., p. 88–91. Miller-Columbian Reporting Service, Washington, D.C.

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New frontiers in seafood preservation. *In* Seafood for health and nutrition, 2 p. Bureau of Commercial Fisheries, Special Fisheries Marketing Bulletin, No. 62–5A.

BROOKE, RICHARD O., ELINOR M. RAVESI, and MAYNARD A. STEINBERG.

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Oceanographic observations and skipjack distribution in the North Central Pacific. [Abstract.] *In* John C. Marr (editor), Pacific Tuna Biology Conference, August 14–19, 1961, Honolulu, Hawaii, p. 22. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 415.

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Commercial fisheries outlook, October–December 1962. U.S. Fish and Wildlife Service, Fishery Leaflet 336, 4 p.

Fish protein concentrate—lifeline of the future. 11 p.

Fish recipes for Lent. Special Fisheries Marketing Bulletin (for food editors), 16 p.

Fishery motion pictures (list of). U.S. Fish and Wildlife Service, Fishery Leaflet 452 (revised), 23 p.

Happy holidays. Special Fisheries Marketing Bulletin (for food editors), No. 62–7A, 2 p.

List of fishermen's and fish shore workers' unions in the United States. U.S. Fish and Wildlife Service, Fishery Leaflet 293, 8 p.

List of fishery associations in the United States. U.S. Fish and Wildlife Service, Fishery Leaflet 254, 13 p.

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Programs and activities of the Bureau of Commercial Fisheries. U.S. Fish and Wildlife Service, Circular 135, 20 p.

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Monthly mean charts, sea surface temperature, North Pacific Ocean. U.S. Fish and Wildlife Service, Circular 134, 3 p.

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Annual report, Biological Laboratory, Woods Hole, Massachusetts, for the year ending June 30, 1961. U.S. Fish and Wildlife Service, Circular 137, iii+89 p.

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New England fisheries monthly summary (1962). Twelve issues, January to December, total 288 p.

BUREAU of COMMERCIAL FISHERIES, BRANCH of ECONOMICS.

U.S. customs receipts from imports of aquatic products for calendar years 1960 and 1961 and list of duty free aquatic products, July 1962, 16 p.

BUREAU of COMMERCIAL FISHERIES, BRANCH of LOANS and GRANTS.

Fisheries loans for vessels, gear, and research. U.S. Fish and Wildlife Service, Fishery Leaflet 542, iii+8 p.

BUREAU of COMMERCIAL FISHERIES, CHICAGO MARKET NEWS SERVICE.

Monthly summary of Chicago's wholesale market fresh and frozen fishery products receipts and prices (1962). Twelve issues, January to December, totaling 168 p.

BUREAU of COMMERCIAL FISHERIES, HAMPTON MARKET NEWS SERVICE.

Monthly summary of fishery products for Baltimore, Maryland. Twelve issues, January to December, totaling 96 p.

Monthly summary of fishery products production in selected areas of Virginia, North Carolina and Maryland (1962). Twelve issues, January to December, totaling 48 p.

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Gulf of Mexico monthly landings, production, and shipments of fishery products (1962). Twelve issues, January to December, totaling 144 p.

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New York City's wholesale fishery trade monthly summaries (1962). Twelve issues, January to December, totaling 240 p.

Bureau of Commercial Fisheries, San Pedro Market News Service.

California fishery products and byproducts brokers and importers, 1962, 6 p.

California fishery products monthly summary (1962). Twelve issues, January to December, totaling 199 p.

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Seattle, Washington, brokers and importers of fishery products, 1962, 6 p.

Washington, Oregon, and Alaska receipts and landings of fishery products for selected areas and fisheries (1962). Twelve issues, January to December, totaling 96 p.

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Butler, Charles, and Joseph W. Slavin.

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Caldwell, Melba C.

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Distribution and seasonal movements of Saginaw Bay fishes. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 417, iii+13 p.

Carr, John F.

Water chemistry and pollution. Dissolved oxygen in Lake Erie, past and present. Proceedings, Fifth Conference on Great Lakes Research, April 9–10, 1962. University of Michigan, Institute of Science and Technology, Great Lakes Research Division, Publication No. 9, p. 1–14.

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Effect of dietary protein and amino acid levels on performance of laying hens. [Abstract.] Poultry Science, vol. 41, no. 5, p. 1635.

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Review of *Morphologie und Funktion des Kiefer—und Kiemenapparates von Tiefseefischen der Gattungen Malacosteus und Photostomias (Teleostei, Isosponduli, Stomiatoidea, Malacosteidae)*, by Klaus Gunther and Kurt Decker. 1959. Copeia, 1962, no. 1, p. 239.

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The effect of storage in refrigerated sea water on the amino acids and other components of fish. *In* Eirik Heen and Rudolf Kreuzer (editors), Fish in nutrition, p. 220–221. Fishing News (Books) Ltd., London, England.

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